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PTERIDOLOGIST

The Fern Magazine

SPECIAL 25th EDITION

1984 - 2009
25 YEARS of the PTERIDOLOGIST

EDITED BY M.H. RICKARD

AND A.E. GREENING

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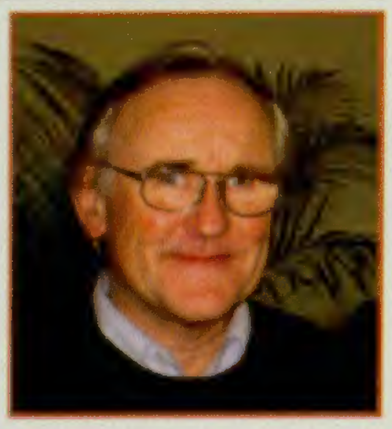
BRITISH PTERIDOLOGICAL SOCIETY

Editorial



For the second year running we have greatly increased the size of the *Pteridologist.* The increase was not planned but we were in receipt of so much good material before the January 31st deadline that, with the Committee's permission, we decided to expand the journal by 20 pages. Unfortunately this meant switching to a more expensive binding but Alec managed to arrange this fairly painlessly and within budget!

I must comment on the copy offered this year. Much of it is in response to requests from me or Alec, with hardly anyone letting us down. Once again very many thanks to all our contributors. In the past I have had an unwritten rule that articles should ideally not exceed 4 or 5 sides. Last year we exceeded this with an important article on the BPS/RHS herbarium at Wisley. This year again I have broken my rule simply because the article in question, by Tim Pyner, is exactly the type of material I want to publish but the type which gardeners are reluctant to offer. Tim gives useful cultural information coupled with good notes on a large number of ferns less commonly seen in cultivation. This should be an inspiration to all fern growers.

Sadly this year sees the 15th and last *Tree-fern Special Interest Group Newsletter*. Alastair Wardlaw has produced this for many years, seeking out interesting material and writing much of it himself. Many thanks Alastair. A note to tree fern enthusiasts - I fully expect to see tree ferns continue to feature regularly in the journal, please send your copy to me.

An apology - We had intended to celebrate the centenary of the *Fern Gazette* by republishing some early articles. Unfortunately they were a victim of space shortage. Maybe it will be possible to celebrate 101 years appropriately next year! We hope so. These early journals are full of fascinating material, almost all of it of particular interest to fern growers.

Please don`t assume that we will not need copy for next year. We will! Also please don't wait to be invited to contribute, use this and earlier issues as a guide to suitable material. Whether or not we can produce another bumper issue depends on you….

Finally don't forget, please send copy to me before the 31st of January.

Martin Rickard

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This edition celebrates 25 years of the *Pteridologist* and it is interesting to look back at the technical progress made over that time. Members had to wait 12 years before coloured images appeared in the 1996 edition, and a further 6 years before it appeared in A4 full colour format in 2002. James Merryweather was the editor on both of these occasions. This edition is the first time that the *Pteridologist* has appeared in what is known as perfect binding, where the spine is flat, simply because we had too many pages. If you think that this edition is large at 84 pages, (including the covers) there was a time when Martin and I were talking about the possibility of running to 100 pages!

My biggest problem this year has been dealing with low resolution images. The *Pteridologist* is all about high quality colour images and there is only so much one can do with various image manipulation programmes! If there is a button on your digital camera that will change your image from 'low res' to 'high res' please use it!

Alec Greening

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Notes for contributors

Ideally we would like contributions on disc or by e-mail, with high resolution images. If this is not possible we will not rule out typed or hand-written copy. In general please follow the style of material in this issue.

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Preview

PTERIDOLOGIST 2009

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Pellaea andromedifolia

MISSOURI BOTANICAL
JUL 15 2009
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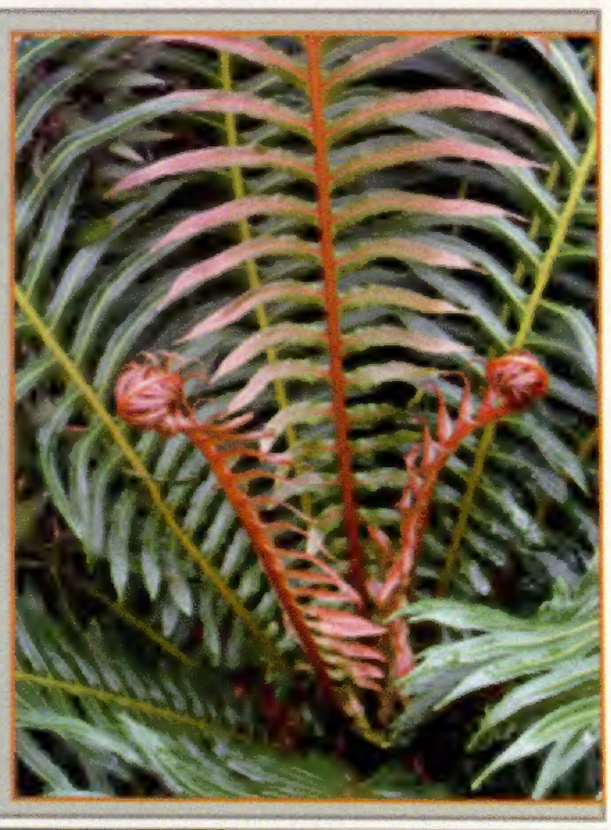
Cover Picture: Front

The winning picture at the North West Group AGM photographic competition 2008. Croziers of *Blechnum gibbum* taken at the Royal Botanic Garden Edinburgh.
Photo: Linda Greening



Cover Picture: Back

The back cover is based on the adjacent picture of *Blechnum brasiliense*
Photo: Linda Greening

Unless stated otherwise, photographs were supplied by the author of the articles in which they appear

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The first Pteridologist

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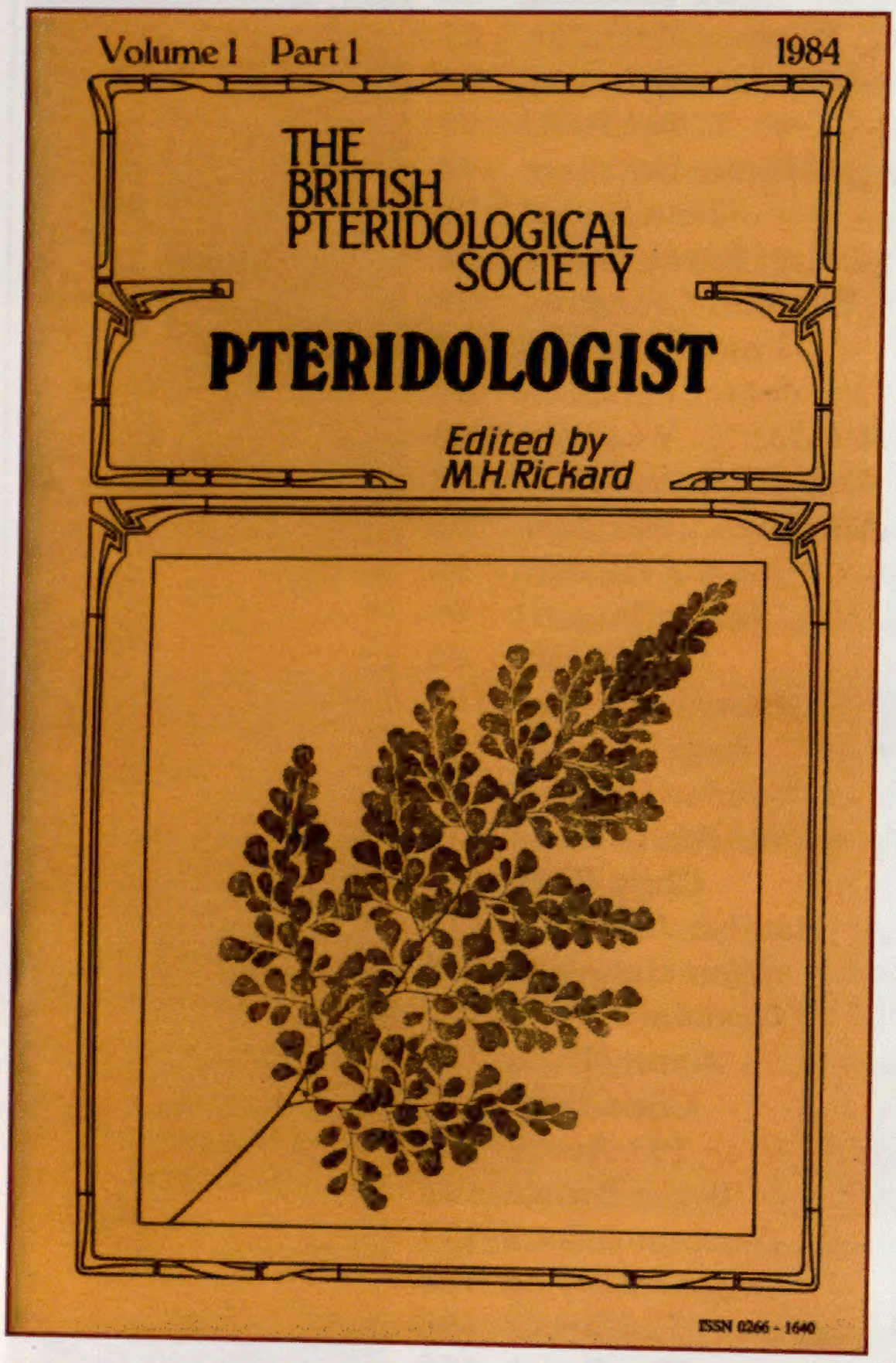

25 years ago, in 1984, the B.P.S. launched a new publication called the *Pteridologist.* The year was also significant as the 75th year of publication of *The Fern Gazette*, which was origionally dedicated to the fern grower and variety enthusiast. (See the article by Martin Rickard on page 110) The *Pteridologist* was seen as a way of improving the service to growers and other enthusiasts.

Published in A5 this first edition ran to 48 pages with black and white illustrations and photographs. The cover was designed by Richard Rush, who also designed the cover for the *Bulletin*, hence the similarity.

At first glance it would appear that things have hardly changed. Some member's names are very familiar. Identification of species and sub species presented problems. 'Pteridomania' in Victorian times was blamed for species rarity and ferns appeared in unexpected habitats.

Martin Rickard was the editor! In 1979 he had taken over as editor of the *Bulletin* from Jimmy Dyce and passed it on to Matt Busby in 1984 in order to concentrate on the *Pteridologist*. In his first editorial of this new publication he mentions a possible standard format being drawn up for the publication of new variety names and makes a particular request for news of new varieties, raised or found.

Clive Jermy, President at that time, contributed an article entitled "The Scaly Male Fern – Problem Fern Number One" where he writes in some detail of the difficulties in allocating sub-species to *Dryopteris affinis*. He describes the work of Christopher Fraser-Jenkins that suggests that there were four sub-species; *affinis, borreri, stilluppensis* and *robusta*.

An article about *Cystopteris dickieana* by Peter Marren traces the history of the discovery and decline of this rare fern and bemoans the Victorians for over collecting. His article, however, finishes with "The population (of *C. dickieana*) has never sunk to a dangerous level in living memory, and its survival prospects would appear to be favourable."

Adiantum capillus-veneris was found on a disused railway bridge at Daventry, Northants. (Is it still there?)

But, this first edition also shows that great changes have taken place. As expected, the Officers and Committee have altered over the years. In 1984 there were 25 people involved, today there are 32, with four members still serving! (Matt Busby, Mary Gibby, Anthony Pigott and Martin Rickard.) The annual subscription was £7.00, and membership stood at 558.

Of the seven fern nurseries advertised inside the back cover, only two (Fibrex and Fancy Fronds) have survived.

Sadly, many of the contributors of this first edition are also no longer with us, notably Reggie Kaye and Jimmy Dyce.

On page 121 I have reproduced some of the contributions from Jimmy Dyce that were scattered throughout this first edition - remember they were written in 1984! ❐

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Back from the dead in Corrie Fee

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Readers might recall the report last year of a very dead *Woodsia alpina* that was unfortunate enough to have been growing in an area in Corrie Fee where water regularly trickled across the rock face. When we saw the brown mass its identity was clear from the alpina-shaped pinnae (about as long as wide) in the wet crack.

We had with us Andrew Ensoll, known to many as the fern grower at the Royal Botanic Garden Edinburgh. Andy scooped up some fragments intending to dry them off and sow them. As the months went by I heard reports of the appearance of gametophytes, which was not surprising as the hillside would have been covered with a variety of spores. The next report was of two different kinds of gametophytes, subsequently refined into the statement that some looked like Woodsia gametophytes. As anyone who has grown ferns from spores will know it is not usually very easy to distinguish different species of fern gametophytes, but Andy did have years of experience with growing *Woodsia ilvensis*. The next time I saw Andy he invited me to come and see nine plants of *W. alpina* and six pots full of gametophytes! (Fig.1)

Fig.1 Gametophytes and young plants of *Woodsia alpina*

In less than a year from their first collection the earliest plants became fertile (Fig.2) and more have now grown from the remaining gametophytes. This is a good example of how a sporebank can allow plants to be grown when they might otherwise have disappeared. Whether it will happen naturally from the remaining fragments is yet to be seen, but this second very wet summer might have helped. It has demonstrated that for this individual plant, possibly for *Woodsia alpina* in general, there has been no problem for the gametophytes in self-fertilisation.

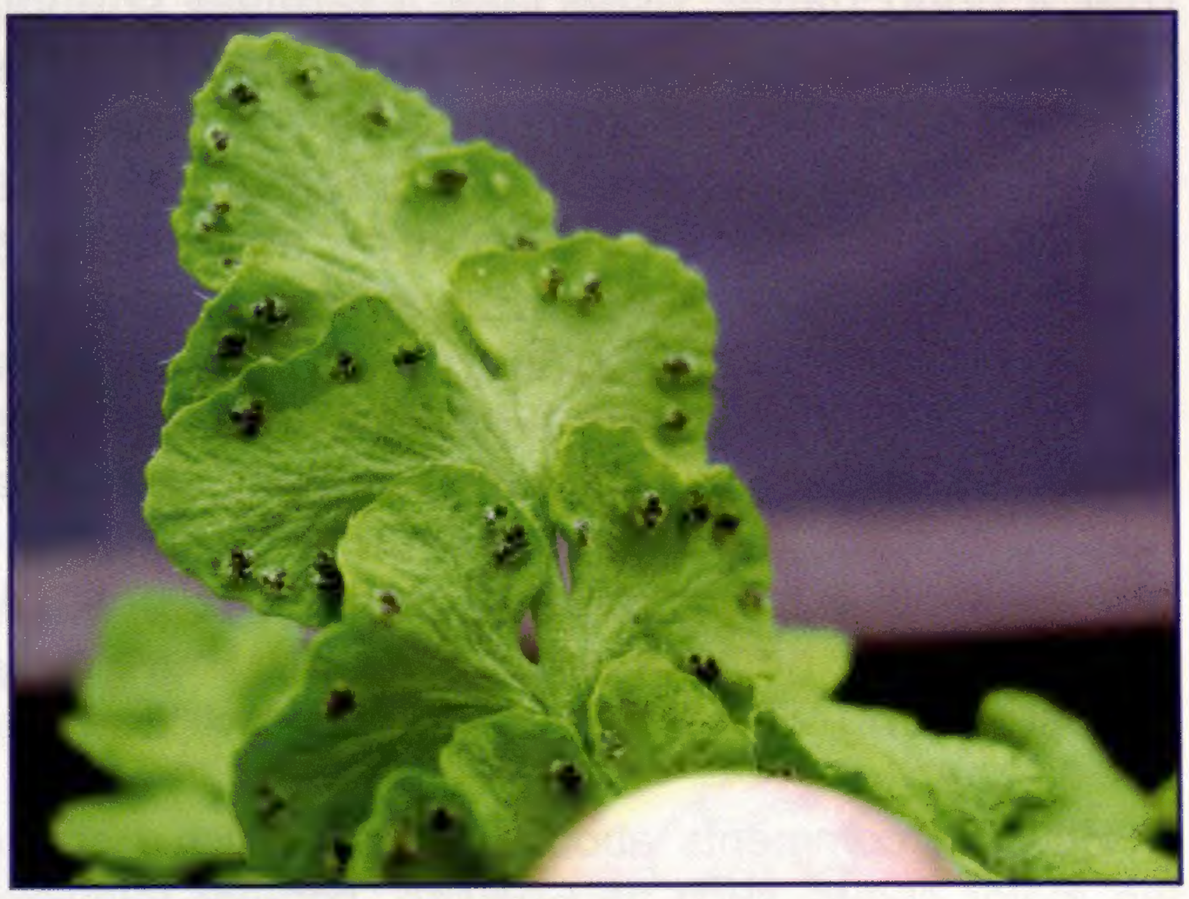

Fig.2 *Woodsia alpina* - Sori produced on young sporelings

With living plants now available (Fig.3) it does raise the possibility of a re-introduction but this would have to be carefully considered and discussed. Other *W. alpina* plants in the same area have died from unknown causes and there would be little point in new planting without understanding why the originals had succumbed. It might also be of limited benefit to plant a whole new population based on one original source. The plants will be useful for a garden which is being planned around the new visitor centre not far away at the end of the public road. Here we are hoping to show some of the local specialities which are in cultivation at the RBGE. There would be a mixture of flowering plants, including a range of montane willows, and we can provide both species of Woodsia, which would not have been possible only a short time ago. ❐

Fig.3 Young *Woodsia alpina* plant.

Fern fads, fashions and other factors.

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In the last *Pteridologist*. (2008 Edition Volume 5. Part1.) I wrote about the top selling ferns of year 2007.

Whilst the 'Top Six' lists of many nurseries proved very interesting, I found that the notes that several nursery owners provided were even more fascinating, showing an insight into the reasons why certain ferns sell well and the sort of clients that nurseries cater for. Three nursery owners, in particular, went to a great deal of trouble.

Neil Timm, from the Fern Nursery, Binbrook, Lincolnshire, concentrated on what he sees as the main reasons that certain ferns sell."What's in a name?" appears to be very important!

Athyrium filix-femina 'Victoriae'

Athyrium filix-femina 'Frizelliae'

Hart's tongue
Asplenium scolopendrium

Shuttlecock fern
Matteuccia struthiopteris

Holly fern
Cyrtomium fortunei

"When talking to many keen amateur gardeners, the main reason usually cited for not buying, or taking more of an interest in ferns, is the "difficult", "unfamiliar" and "complicated" names

Some ferns get asked for by name, in particular, the *Athyrium filix-femina* types, 'Frizelliae' (as 'Tatting Fern'), 'Victoriae' and 'Axminster', as well as "Hart's Tongue", "Holly Fern", and "Parsley Fern". So it would seem that a good name, especially a familiar sounding English name, may well be the main thing to possess if you are a fern and you strongly wish to get yourself sold. This is confirmed by the fact that the question, "Which Holly Fern?" usually gets a look of complete bafflement, but since most of them seem to want a large border fern, and not an alpine, I usually sell them a *Cyrtomium*, rather than a *Polystichum lonchitis*. While the question, "What do you know about Parsley Fern?" is, as I have found, best not asked at all; "I think you might prefer?" being an opening which saves a lot of unnecessary complications. This does, however, point to a trend for the future, since as fern buying seems to be more influenced by a wariness of the unfamiliar than anything else, it is possible that for as long as ferns continue with their current popularity, there may well come to be a widening of taste along with a widening of knowledge".

He then comments about fashions which I suspect are strongly influenced by the major shows such as Chelsea, popular television gardening programmes and magazines.

"Five years ago the most popular ferns were, without any hesitation, the coloured forms of *Athyrium niponicum*. At that time these were selling as though life itself depended upon it, but in the last few years I have noticed a rapid decline in their popularity. This seems to be for two reasons. Firstly, that most of the more earnest gardeners now possess, or have at least tried, it and it has therefore lost a lot of its novelty value. Secondly, because it seems to be beginning to develop a reputation for being difficult to grow, and for being unreliable, even if it grows quite well for a while. There does, however, seem to be a small but growing demand, especially among the ranks of the more earnest plant collectors, for named cultivars of this plant, which I suspect may continue for some time. *Matteuccia struthiopteris* has also, over the same period, declined in popularity from being one of the most popular ferns. Mainly due, I suspect, in this case simply to becoming over familiar, as it could hardly be called difficult; it still however continues to be in demand, and is often asked for by name."

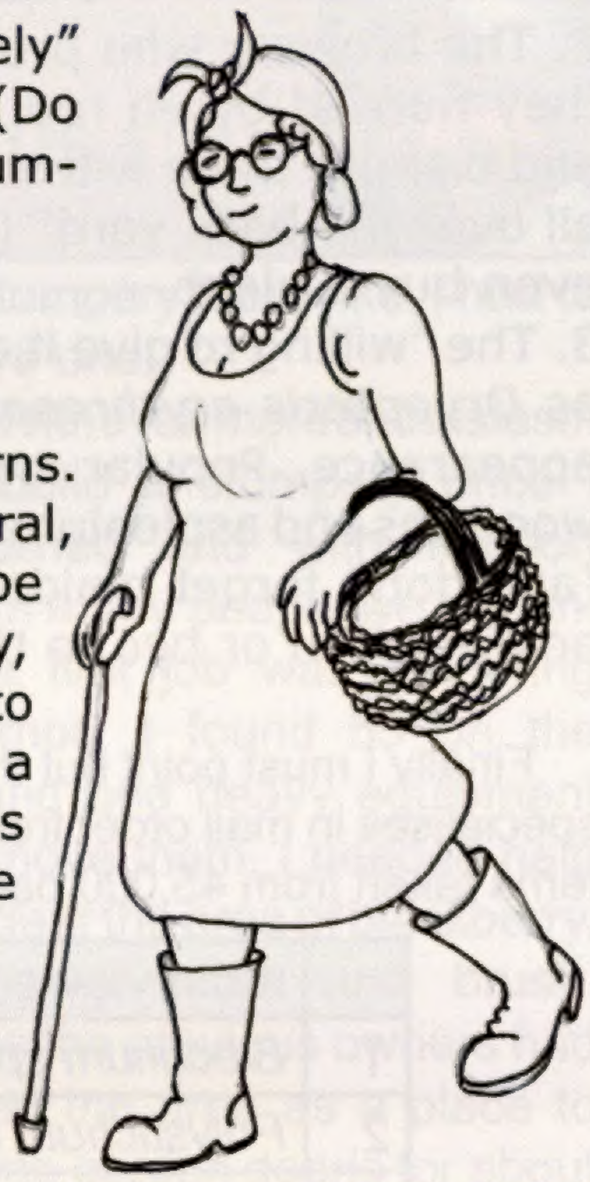
Descriptive comments are usually a major factor, depending on the client. The words "evergreen" and "easy" seem guaranteed to sell any fern to the general public, but there are also descriptive terms that have a negative effect.

Fern fads, fashions and other factors

"Gardeners are also, usually quite certain, that what they, "definitely" do not want, is anything that carries with it the danger of "spreading". (Do you think there could be a condition that would bear the name Pteridium-phobia?)"

Even sexual stereotypes appear to be a factor when it comes to selling ferns!

"There are differences between the genders, even in their choice of ferns. Both will go for something which is described as big bold and architectural, but men are much less likely to buy something whose qualities can be described using words such as modest, subtle, and delicate. Conversely, for some sort of gardening ladies these are just the words that seem to make their eyes light up. I am sorry for the social caricature, but if I see a person approaching, who looks like they sometimes wear headscarf, pearls and green wellies at the same time, then I feel almost certain, that I have already sold *Gymnocarpium dryopteris* even before we begin."



'Mrs Fern' the archetypal purchaser of *Gymnocarpium dryopteris* complete with wellies, headscarf and pearls!

So if a fern is going to sell to the general public, first it has to appear in the media, second it needs a familiar sounding common name and third the key words "evergreen" and "easy" need to appear in its description. If only it were that simple!

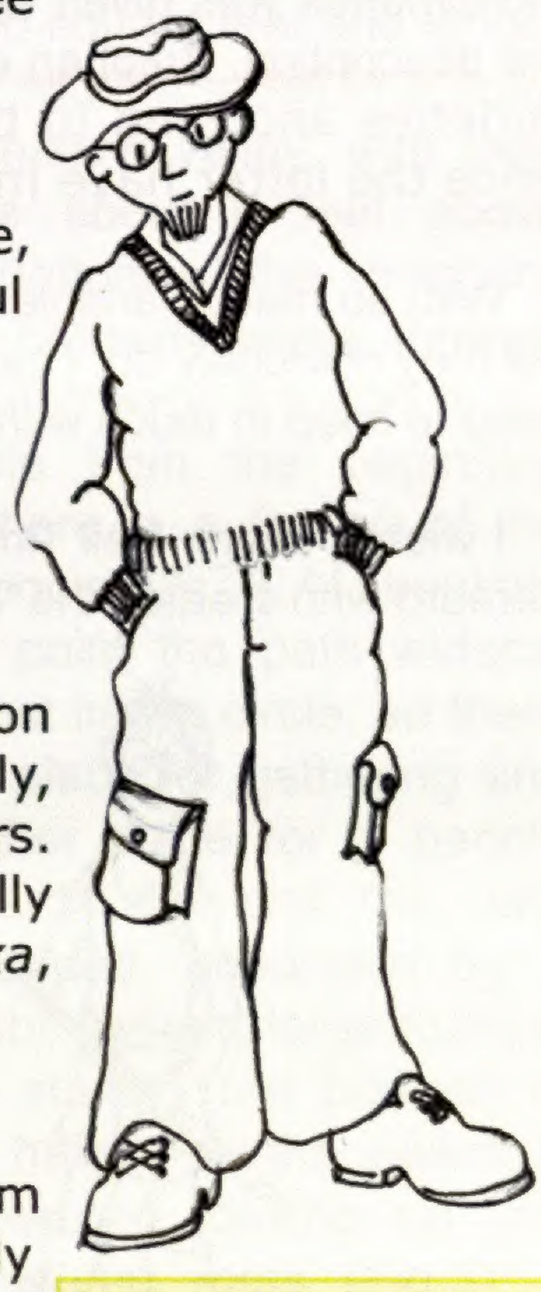
Sue Olsen, from Foliage Gardens, S.E. Bellevue, Washington. U.S.A. wrote about the different types of clients and how that appears to affect the type of ferns bought.

"Mail Order -
My customer base can be divided into three categories -
1. My best friends, of course, are the long time loyal customers some of whom have been placing orders for their private or public gardens for thirty years or more. They are enthusiastic and well informed and are looking for newly introduced or unique types with a preference for evergreens, especially those with promise from Japan and Asia. Other favourites are the diminutive types including the xerics, so cheilanthes and aspleniums tend to sell well. Some of this year's highly requested species included *Polystichum makinoi, P. tagawanum, P. monticola* and *P. dracomontaum*, with the latter three being in limited supply.

Gymnocarpium dryopteris

2. The one shot crowd who are of two main types -
   a. The buyer who is installing a garden and needs some 20 - 30 ferns for the decor. Traditionally he/she will purchase combinations of attractive, albeit relatively common, ferns such as *Athyrium niponicum* 'Pictum', colourful dryopteris and frequently will never place a significant order again.
   b. The buyer who has just read an article in a magazine or other periodical and HAS to have the featured fern. Many years ago, *Athyrium filix-femina* 'Victoriae' was given front and centre coverage in a national magazine and this was followed by an attack of some 300 plus phone calls (quickly demolishing my available supply.)
3. The newcomer who is enthusiastic and interested in establishing a collection or at least introducing a token fern or two into the landscape. Frequently, however, they develop a greater interest and will become repeat customers. Favourites here are easily described - hardy, handsome and not dreadfully expensive. My best sellers for this group include *Dryopteris x complexa*, assorted cold tolerant polystichums and osmundas.

Public plant sales -
Again the shopper profile can be divided into categories -
1. The knowledgeable customer who can spot a newly available fern from fifty feet and will seriously examine the display for desired species. Usually he/she already has an established collection so wants the "new" offerings and is willing to take extra care of those that have special requirements. These folks are frequently old friends and the visit always involves a pleasant sharing of opinions and ideas.



'Mr Fern' the knowledgable customer about to spot a newly available fern from 50 feet.!

2. The browser who probably knows that ferns don't have flowers, although some have asked as they hurried by en route to the more flamboyant displays. They can look at tables of dryopteris and dismiss them with comments such as, "They all look alike." or better yet, "I have that growing all over my back yard" (unaware that the referenced plant is from Japan). They may on occasion even buy a plant.
3. The "willing to give it a try shopper" that will spot and purchase a fern with colourful fronds (such as *Dryopteris erythrosora, Dryopteris lepidopoda* and *Athyrium otophorum*) or a non-traditional appearance. Popular types include small items such as *Dryopteris affinis* 'Crispa Gracilis', little woodsias and aspleniums along with assorted *Polystichum setiferum* cultivars and large woodwardias (and don't forget maidenhairs). This buyer will often report back the following year and add yet another fern or two to their shopping cart annually."

Finally I must point out the work done by Stephen Pasek from Plantessential P.O. Box 7941 Nottingham who specialises in mail order from his web site. Using the statistics from this site he analysed the top ten most viewed ferns taken from 45,000 page requests from all over the world! Comparing this list to his best sellers we have:-

	most viewed ferns
1	*Blechnum spicant*
2	*Polystichum munitum*
3	*Athyrium filix-femina*
4	*Athyrium niponicum pictum*
5	*Gymnocarpium dryopteris* 'Plumosum'
6	*Polystichum tsussimense*
7	*Cyrtomium falcatum*
8	*Athyrium otophorum*
9	*Phegopteris decursive pinnata*
10	*Matteuccia struthiopteris*

	mail order best sellers
1	*Asplenium trichomanes*
2	*Polystichum munitum*
3	*Polystichum setiferum* varieties
4	*Dryopteris affinis* varieties
5	*Athyrium filix femina*
6	*Blechnum spicant*

The top three 'most viewed' are also in the best seller list, this would seem to be logical. However the other three best sellers were low down in the viewing statistics. Is this a case of 'once seen – must buy' or are there other factors at work here? As far as his top seller is concerned I did note that in his web site *Asplenium trichomanes* was given its common name and the key words, "evergreen", "hardy" and "pretty" were used in the description. Stephen did comment that in mail orders, "people pick and mix across a wide range of varieties and tend to be quite eclectic, in general evergreens out sell deciduous, which is a pity since the latter have much to offer!"

With so many variables it's a wonder that fern nurseries can keep track of fads, fashions and other factors, but they obviously do. I can only repeat my conclusion from my previous article that as dedicated fern lovers we need to keep in touch with our local fern nurseries, if only to encourage them to keep up the good work! ❐

I wish to thank Neil Timm, Sue Olsen and Stephen Pasek for their contributions and also the artist Richard Barnard who created the 'Fern Family' specifically for this article.

'Master Fern':- A keen amateur, full of enthusiasm for anything horticultural, but yet to learn about bare legs and nettles!

'Miss Fern':- A very determined young lady who wants to study botany and become a fernologist!

A Stumpery on Vashon Island near Seattle

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The new stumpery has turned one year old in October of 2008. It was an interesting year; with its design, planting of eleven tree ferns, 900 ferns, lots of visitors, two on site classes and Winter. It has been both a challenge and a joy. As a new fern gardener the challenge was, and is, to plant ferns to their best advantage; then keep them alive and learn about them along the way. The joy has been, and still is, to walk into the stumpery every day and see it's wonder. But also to see the amazement on the faces of others who have come to see it. Most people here have no idea what a stumpery is, and after explaining the concept most still don't until it is experienced. The response is always the same, that only by entering the stumpery does one truly understand what has been created.

It started as a wild idea; to build a stumpery on a piece of property we have on an island in Puget Sound, a short distance from Seattle (Fig.1). I toyed with the idea for some time but having never seen one I had no concept of how they were built. Then an opportunity came along when I went to England with Sue Olsen and Naud and Wim Burnett on a fern tour lead by Martin Rickard. I was able to see three stumperies which helped me visualize what a stumpery looks like. I had to have one!

Fig. 1 The site ready for work. Weeds had been removed but *Polystichum munitum* was left in situ.(Oct 07)

Fig.2 View into stumpery interrupted by large stump in the 'middle' of the path. (June 08)

Fig. 3 Day 2. Stumps bermed - placed on mounds to accentuate size.(Oct 07)

With even more enthusiasm to build a stumpery once I returned and with support from many people we began. The first job was gathering stumps; I found 55 on the island and heavy equipment to move them. I needed help to clear the area of blackberry, stinging nettle and brush. Plus the previous owners had used the area as a place to dump garden debris for about ten years.

In the span of two days the design was defined and the 55 stumps placed. At last I had the bones so I could then plant. I have to say that the concept of stumps as a backdrop was so unusual and the experience of walking through it so unique in it's own right that plants were a bonus.

The stumpery is about 9,000 square feet and longer than wide. It is set in a gully, or shallow valley, with both sides about 6 feet above the bottom of the stumpery. The pathway winds through the stumpery; the end is not visible from the beginning so there is a feeling of the unknown (Fig.2). At about the mid point the path widens, almost into a circle, so there is a place for gathering and another place for a bench. Towards the end the path is divided, separated by a grouping of very large stumps. The stumps are bermed to add height, so the viewer is below and looking up into the stump roots (Fig.3). A stairway was built into one side to reach the entry. I am now working on clearing the

area around this stairway of debris in order place a few more stumps and plant.

Additional stumps have been added to fill in gaps, define the paths and cover the entry tunnel. I had always wanted a tunnel so my husband designed one that will be in place long after the stumps are gone! It measures about five feet wide, ten feet long and 10 feet tall. The tunnel form was made of 6x6 timbers set in concrete; the walls were stabilized with iron rebar. This we covered with more stumps totally covering both sides and the roof with stumps.(Fig 4). It was important to finish the tunnel because Martin had agreed to come and lecture to at the Hardy Fern Foundation annual general meeting and fern sale As an addition, a class for 50 gardeners was planned for the stumpery a few days after the general meeting and lecture with Martin, Sue Olsen and Richie Steffen doing different classes all about ferns.

As I write today the stumpery has about 115 stumps, a 1000 ferns, a tunnel covered in stumps to mark the entry, eleven tree ferns: two *Dicksonia squarrosa* (Fig.5) at four feet, three *Dicksonia fibrosa* at three feet and six *Dicksonia antarctica* at four to eight feet.

Seattle is a city with a large population of recreational boaters and there is a saying that the two happiest days of a boaters life is when he is buying and then later sells his boat. The same could be said about gardeners. The two happiest times are conceiving the garden and Spring. The most unhappy time is Winter! Several winters here have been very mild but not this one. The Winter of 2008 has been a reminder of what our winters can really be. This winter snow has come and stayed, in some areas up to 12 inches. Temperatures in the teens ^{o}F, wind, then three inches of rain in 24 hours. We've had everything.

Fig. 4 Richie Steffan posing under the freshly 'stumped' arch.(June 08)

Fig.5 *Dicksonia squarrosa* before the harsh 2008/2009 winter.(June 08)

Fig. 6 *Pyrrosia lingua* cvs. top and *Polypodium scouleri* centre planted in soil pockets on the trunks.(June 08)

I have taken Martin and Professor Wardlaw's advice. Stuffing the crown to keep it dry and wrapping the trunk with foil then a cloth called Remay. The first winter we sailed through, but not this one. I again wrapped and stuffed crowns. But this year my wrap was better. Last year I used kitchen foil, this year a special foil my husband found. It is made of four layers: the inner and outer layer are heavy foil and the two inner layers are heavy paper. This is all laminated together in sheets 4 feet by 8 feet. I wrapped all the trucks with this, sometimes being able to circle the trunk twice. The crowns were packed with leaves, bracken and Remay then a lose foil cap over that. The *D. squarrosa* I enclosed completely including fronds. The *D. fibrosa* I did just the stuffing/ wrapping trunks method and the *D.antarctica* the same. The *D.fibrosa* and *D.squarrosa* look fine but *D.antarctica* not so fine. The snow here is heavy and with the frond lengths the weight of snow broke the fronds. To a novice fern grower who loves tree ferns it is a horrible

sight to see.

There is really nothing I can do but wait for the magic of Spring. The weather has turned mild now and we have had no rain. So I decided I would unwrap trunks and water but also clear out the crowns so they can air and dry out. There is a humour in all this when I cleaned out crowns I found filbert nuts. Somebody`s been saving up! After a few days of airing out I re-stuffed the crowns with dry leaves and Remay and put the foil wraps back in place. The most difficult part now is waiting.

Fig.7 Freshly planted bank leading down to arch.(June 08)

What will the new year bring? I hope new fronds on tree ferns! As I find them I hope to plant more unusual ferns. I had originally planted large quantities of fairly common ferns to fill the space with the idea that as I acquire the more unusual ones I would reduce the numbers of more common ones.

I still need to add small stumps to better define the paths and cover more of the tunnel. I also want to add more ferns and other plants to the stumps themselves. I have added ferns, small epiphytic Rhododendrons and Agapetes. The ferns are Pyrossia and Polypodium species; both of which have so far come through the harsh weather with flying colours. While I love plants I have been very careful about what I add to the stumpery. The plant palette is small and the intent is to compliment the stumps not overwhelm them. Once the stumpery is several years old the hardest job will be editing.

This garden has brought so much joy. I have spent countless hours planting, weeding and sharing this wonderful creation. My thanks to everyone who encouraged and helped with this project. □

Strange Revisions to The Junior Oxford English Dictionary

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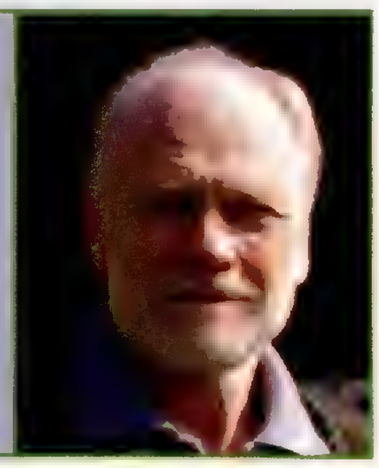

It may be of concern to members of the B.P.S. to learn that the words 'fern' and 'moss' no longer merit inclusion in the Junior Edition of The Oxford English Dictionary. The omissions came to light when a seven-year-old boy attempted to find the words in the most recent edition. The boy's mother then compared this with previous editions and found other questionable changes; words relating to British history and nature were removed in order to allow room for 'modern' vocabulary to do with Internet and celebrity.

The changes were then made known to the press and objections were raised in other English speaking countries. Canadians in particular were annoyed that their national symbol, the beaver, was removed. I am not aware of any complaints from New Zealand but I suspect that *Cyathea dealbata* was never included in previous editions.

Common names of flowering plants such as Dandelion have also been removed. Now, as 'Wilde' might have remarked, to lose the term for an individual species may be considered unfortunate but to lose the term for a group of some 10,000 species starts to look like carelessness.

I am assured by the Oxford University Press that they welcome comments on revisions to their dictionaries, so if you are suitably incensed by this example of 'literary vandalism' address your complaints to: -

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Mauchline Fern Ware

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Mauchline ware is the name given to an extensive range of small, wooden articles made mainly in Scotland from the early 19th century to the 1930s.(Fig. 1) The small town of Mauchline (pronounced 'mock-lin') in Ayrshire, was the centre of their production. They were also made in other parts of Scotland, notably Lanark but not in such large quantities.

In the late 18th and early 19th centuries when snuff-taking was popular, over fifty companies in Scotland, particularly in Ayrshire, were producing snuff boxes by the 1820's but soon after the habit began to decline and with it the demand for the boxes. Companies needed to diversify to stay in business. One of the few companies that survived and became the best-known manufacturer of Mauchline ware was that of William and Andrew Smith of Mauchline. They continued to make wooden snuff boxes, although in smaller quantities, well into the 1870s, but they and their remaining competitors turned their lathes to the production of a vast range of small, wooden items: sewing notions, stationery items, miscellaneous domestic lines and cover boards for books of all kinds. Boxes of every shape and size for every conceivable use, many with the famous Mauchline ware invisible hinge, were produced in vast quantities. Between them these companies produced tens of thousands of items until the 1930s. They were manufactured mainly in sycamore, a close grained wood in a pleasing light and even pale cream colour. They were sold throughout Scotland, England and Wales and abroad through a well-developed export market. Very many survive to this day, testament to the quality of the craftsmanship. W & A Smith were the manufacturers of the greatest number by far of these wooden items, hence they became known after the small town in which they were produced. W & A Smith ceased production abruptly in 1933 when their factory was destroyed by fire.

Fig.1 A selection of coloured spatter-printed fern ware.

Because of their small size, Mauchline ware made ideal souvenirs and this is reflected in the styles of decoration. The earliest pieces, which continued to be made throughout the time Mauchline ware was in production, were decorated with a transfer photograph of a view from the town or resort where they were purchased and, unsurprisingly, were known as souvenir transfer ware. Tartan ware, in which items were decorated with tartan printed paper, was another popular souvenir style design. The third major style, last in the line, used ferns for the decoration, first appearing in 1870 after W & A Smith found a way to use them to decorate their articles.

The Victorian fern craze and the Great Exhibition 1851

The story of Mauchline fern ware has its beginnings with the Victorian Fern Craze of the mid -1800s. Anyone looking for inspiration for a new style of decoration would be already primed to ferns, but the spur to actually using ferns to decorate articles came from The Great Exhibition of 1851, which had guided public opinion in the direction of the 'cultivation of detail'. So began the Victorian passion for ornately decorating everything that could be decorated: ceramics, silver ware, glass, fabrics, including lace, furniture, and even memorials and buildings. This decorative phase was already well established by the middle of the 1850s but surprisingly it was only as the mania for collecting and growing ferns waned at the end of the 1860s that ferns as a decorative motif

became popular. It was about 1870 that W & A Smith produced the first fern ware, but they were soon followed by the Caledonian Box Works in Lanark.

Fern decorated Mauchline ware

Some statistics

Even after examining just a small number of items one is soon surprised by the variety of ferns which are represented and that the majority (in my count to date) are not British natives. However, a quick perusal of plant nursery catalogues of the late 19th Century shows that a wide range of exotic ferns and some selaginellas were readily available.

Because of the methods used and the fact that only small pieces of leaf were used, particularly in spatter-printed ware, it is not always possible to identify a fern with certainty and sometimes not at all. But from the 28 pieces of Mauchline fern ware that I have examined to date, I have been able to identify with an element of reasonable certainty 17 British ferns (12 to species level, 1 to genus level and 4 cultivars), 20 exotic species and at least two selaginellas.

It is the greater number of exotics that may be surprising, but not if one realises that the range of distinctive frond morphologies is limited in native ferns compared especially with non-European species. Of the exotics identified, 12 could have come from NZ. Just as not all British species are confined to Great Britain, so it is with New Zealand ferns. However, the particular assemblages suggests that this is likely to have been their origin. The other exotics identified so far are natives of Central and South America and the West Indies, south east Asia, and one North American species.

With the ferns, the leaves of non-ferns are also included in the designs. So far identified are 6 flowering plants (field maple, hawthorn, rose, ivy, tufted vetch – *Vicia cracca*, and upright hedge parsley – *Torilis japonica*, and a possible delphinium species), a possible *Equisetum sylvaticum* (woodland horse tail), plus one moss!

Fig.2 Face guards were popular items to be decorated with spatter printing. Ferns on this face guard include *Polypodium vulgare*, *Adiantum capillus-veneris* (large and small forms), *Asplenium bulbiferum*, *Asplenium scolopendrium*, *Blechnum filiforme* and *Blechnum penna-marina*.

Fig.3 Jewel cabinet which opens to reveal internal drawers including a secret one.

Fig.4 Four views of a spatter printed, fern ware spill vase.

It is widely agreed that the British ferns for Mauchline fern ware were sourced from the Isle of Arran. But what of the exotics? Were one or more of the manufacturers enthusiastic fern collectors? If not, they obviously had access to the collection of a botanic garden, a wealthy collector friend or a generous nurseryman.

Spatter printing

Three techniques were used to produce the design on articles resulting in very different styles of fern ware: spatter printing, hand painting and photography.

In all the following descriptions, for the sake of simplicity, reference will be made to leaves or fronds. However in spatter printing only pinnae, pinnules or small portions taken from the apex of the larger segments of a frond were used unless the fronds were very small.

Figure 4 is a goblet-shaped spill vase showing four angles of the same vase. The four fronds, seen from left to right, are *Asplenium flaccidum* (Hanging spleenwort) of NZ and Australia; a hard fern, either *Blechnum spicant* (British hard fern) or the New Zealand *Blechnum penna-marina* (Alpine hard fern), a pinna of a possible *Polystichum setiferum* (Soft shield fern), though it may be from an exotic species of *Polystichum*; and *Pellaea rotundifolia* (Button fern), a native in New Zealand only, but a popular house plant in Britain. On the base of the vase there are ivy leaves. It is difficult to identify the *Blechnum* frond exactly. The life size range of the leaves of these two fern spp. overlap and the appearance of the leaves of both are greatly modified by the environment in which they grow, so they can look very similar.

This is the simplest form of a spatter-printed design in that there is only one layer of leaves. Fresh leaves were pressed and while still pliable arranged on the item and pinned in position with fine pins to obtain good contact with the surface after which the complete vase was given several coats of dark brown paint to provide the background for the design. The leaves were then removed leaving their silhouettes, which were lightly sprayed with the background colour to tone them down, possibly using a craft paint spray. Finally, as in all Mauchline ware, the vase was given several coats of varnish to protect the design and to provide a high quality finish.

On many pieces of spatter-printed fern ware the leaves are arranged in two, three or sometimes four layers. The initialled box seen in figures 5 and 6 is such an example. The lid and all four sides of the box are decorated but only the lid and front side are described. Ferns found in Britain decorate the lid whilst on the front of the box, all except one, may be found in New Zealand. The craftsmanship of the spatter-printing is superb.

The two elements of the design on the lid are each composed of two layers of leaves. In preparing the border, *Asplenium ruta-muraria* (Wall rue) was positioned first, followed by the sporeling leaves of *Asplenium adiantum-nigrum* (Black spleenwort) which form effectively, a second layer. Likewise, in the centre, the initials 'C E G' underlie the stems of *Selaginella kraussiana* (Krauss' spike clubmoss). On the front of the box the frond of *Adiantum cunninghamii* (Common maidenhair - NZ) was placed in position first, followed by those of *Asplenium adiantum-nigrum* (Black spleenwort) seen on the left and the young frond of *Blechnum procerum* (Small kiokio) on the right. Finally, from left to right, the *Adiantum aethiopicum* (True maidenhair), *Pellaea rotundifolia* (Button fern), presumed *Athyrium filix-femina* (Lady fern), and the second frond of *P. rotundifolia* made up a third layer. (Despite a silhouette in Page's flora of Britain, which to my mind fits like a glove, two experts cannot agree on the identity of the frond which I have nominated as *Asp. adiantum-nigrum*. This is a good example of the difficulties of identifying the ferns of Mauchline ware because of the limited information available.) The fronds in position, the decoration is completed by the same procedure as described for the spill vase, but with each layer of leaves being removed one at a time and their silhouettes lightly sprayed before the next layer is removed. Note that the spray is not evenly applied – all part of the creation of the design. On the finished item the layers of silhouettes grade in density of colour from the first to the last layer removed, which is left as the natural sycamore wood, and the leaves which formed the bottom layer now appear to be on top.

Rather than using the different densities of one colour to provide variation in tone, many items employ the colours red and green with the colour of the wood providing a third contrast with the dark background. The card tray (Figure 7) illustrates this technique well. The leaves have been arranged in layers as before. The first (bottom) layer being the four Acer leaves on top of which were arranged two rings of four fern pinnae, tentatively identified as *Dryopteris dilatata* (Broad buckler fern). Finally the ring of leaf segments thought to be from *Delphinium* leaves was placed in position. After spraying for the background colour, each layer of leaves was removed and sprayed in turn. The silhouettes of the *delphinium* leaves were sprayed partly red and partly green; those of the four smaller *Dryopteris* pinnae were sprayed red at their base, followed by the

Fig.5 The lid of a spatter printed box.

Fig.6 The front side of the initialled box in Fig 5.

Fig.7 Spatter printed card tray.

Fig.8 A ruler decorated with spatter printed paper with a piece of the paper torn away.

remaining four *Dryopteris* pinnae similarly sprayed with green. Finally, the Acer leaves (field maple?) were removed and the silhouettes partially sprayed red. Any unsprayed areas of the silhouettes remain the natural colour of the wood.

The identification of *Dryopteris dilatata* illustrates another example of the difficulties met with when trying to identify ferns on Mauchline ware. In life, the ultimate segments of the fronds are very distinctive but this is not conveyed when they are spatter-printed. However, by comparing with photocopies of fronds of *D. dilatata* it was possible to confirm the identification.

Spatter printing technique transfers the minimum of information and fine outline detail of the frond segments can be lost if contact with the background is poor. The spraying of real leaves or leaf parts directly onto an item in this way means that one can compare the size of the image to the life size range of possible species. This can be an aid to identification. Occasionally veins were drawn on the silhouettes but those I have seen were poorly executed and not accurate.

Not only was spatter printing carried out directly on the articles to be decorated but spatter printed designs on printed paper were also used. Figure 8 shows a roller ruler where a piece of the paper has been torn away.

More spatter-printed fern ware items were made than those using hand painting images or photography (see below), and unlike transfer and tartan souvenir wares, furniture size pieces of Mauchline fern ware are known with spatter-printed embellishment: occasional and larger tables, chests of drawers, small cupboards and even a wardrobe.

Hand Painting

Figure 9, of a pinwheel and a crochet hook tambour, illustrate the two distinct styles of hand painting found

Fig.9 Left: Monochrome hand painted pinwheel. Right: Polychrome hand painted tambour for crochet hooks.

on fern ware and which for convenience I am calling the monochrome art style and the polychrome art style respectively. More than in the other techniques, both in frequency and relative quantity, they include leaves of flowering plants, the monochrome style especially. All the leaves are usually highly stylised so that accurate identification is often not possible. The monochrome designs are the most stylised and it is guessing in the dark to try identifying with any accuracy many of the leaves, especially the ferns. Some are even ambivalent as to their nature: fern or flowering plant! Is the pinnate leaf on the pinwheel example a maidenhair spleenwort, or a leaf of *Poterium sanguisorba* (Salad burnet)?

The monochrome image is usually applied as a paper print. In contrast, the polychrome style uses colour and is applied as transfers. The fronds of ferns in quite a few rare cases approximate closely to the life-form making identification possible, as with the *Asplenium scolopendrium* (Hart's tongue) on the tambour; but not always! Ambivalent leaves are not so common!

Photography

The least common technique is photography, using fresh leaves. Figure 10 is a detail from the front

Fig.10 Detail from the front cover of a tartan ware photo album.

cover board of a tartan ware photograph album. The photograph is of a bouquet of fronds of *Athyrium filix-femina* (Lady's fern), *Polystichum setiferum* cv. 'Plumoso-divisilobum' group (Soft shield fern, '*plumoso-divisilobum*' group), *Adiantum capillus-veneris* (Maidenhair fern – Brt.), *Polypodium* sp. (Polypody) with some *Rosa* (Rose) and *Hedera* (Ivy) leaves. The gold zig-zag border masks the edge of the print, a device commonly used with paper images.

Photography allows the use of large, whole fronds and those of cultivars with a three-dimensional element in their morphology, such as the *Polystichum setiferum* cultivar with its tiny ultimate segments

which lie far from flat: a detail that would be lost, along with the attractiveness of the frond itself, if pressed for spatter printing. The life-like appearance of the fronds make identification an easier proposition but again beware drawn-in veins. Irrespective of the method used in fern ware, they are usually crudely drawn with no attempt at accuracy. ❐

Acknowledgements

I would like to thank members of the Mauchline Ware Collectors Club who have kindly allowed me to use images of pieces from their collections; also the several members of the BPS who allowed me to cajole them into helping with the identification of the more difficult silhouettes, although in the end it was not always possible to come to a conclusion; and to the member who photographed most of the illustrations in this article for me.

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MORE FERNS IN UNUSUAL PLACES

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Fig.1 *Asplenium trichomanes* at home in the crook of an old mole plough.

Like me, I guess you're always on the lookout for ferns in unusual places. Sometimes, it's that solitary plant without any apparent parent – like the *Osmunda regalis* spotted on a rocky face in a wood on the outskirts of Crowhurst (see the 2008 *Bulletin* for further details). Other times, it may be a carved stone fern seen on an old gravestone or building façade, but, encouraged by Heather McHaffie's articles in last year's *Pteridologist* ("The rare wee bog fern" and "A trailing fern") I thought I'd mention one I spotted in autumn 2008.

Thiswas in South Wales at the entrance to Carreg Cennen castle (SN 668193) near Llandeilo. As you can see from the photos, this particular *Asplenium trichomanes* has made its home in the crook of an old mole plough. The plough rests against the castle entrance/ café/ shop, but the staff in there couldn't tell me how long the plough had been up against the wall, or whether it had been moved from another location (there is a farm implements' museum close by). What was clear though was there were plenty of sporing parents on the stone walls close by leading up to the castle. Natural survival is a wonderful thing! ❐

Fig.2 Detail of the unusual habitat.

The Ptéridophytes of Réunion

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Fig. 1 The Mascarenian islands : a trio of islands lying to the east of Madagascar

Fig 2 *Asplenium nitens*

Fig. 3 *Ctenopteris argyrata*
(= *Ceradenia argyrata*)

The British Pteridological Society expedition to La Réunion in October 2006 afforded me the opportunity to meet a group with both an enthusiasm for ferns and enthusiastic that others should enjoy them. Following the fruitful discussions made possible by this meeting, I decided to outline the main features of the island and its pteridological riches for the benefit of those members who did not have the good fortune to see them.

A tropical volcanic island

The island of Réunion belongs, with Mauritius and Rodrigues, to the Mascarene archipelago, in the south-east of the Indian Ocean (fig.1). Centred at 21°07'south and 55°30 east, Réunion lies about 800 km to the east of the coast of Madagascar. Although the largest of the group, it is still an island of only modest dimensions, with an area of just 2512 km². Its diversity of flora is due to its volcanic origin and its tropical situation.

This volcanic island was the result of the activity of a hot-spot, still in evidence at Réunion's volcano (La Fournaise), and which was also the origin of Mauritius.

An island of recent origin, it emerged about 3 million years ago, well after Mauritius (8 million years ago). For this reason, the slopes have not yet been softened by erosion as is the case with its sister island, and the central part of the island is occupied by mountains cut in a spectacular fashion, culminating in the Piton des Neiges (3070 m). After its emergence, the island was colonised, from nothing, principally by elements of the African - Madagascan flora and fauna.

A tropical island, Réunion is permanently subject to easterly winds, which bring moisture. In the warm season there is the additional passage of cyclones across the region, while in the cold season southern depressions move up from the southern Indian Ocean.

This combination of different factors, combined with the significant elevation, creates a great variety of microclimates and habitats, which favours a wide biological diversity. The first important factor is the division between the east and west halves of the island

The east (windward) side exposed directly to the prevailing wind receives a high rainfall (always above 2m/year, in the order of 4-5 m over large areas, and sometimes very much more, reaching 18m in some years in certain areas of La Fournaise). During the passage of cyclones, Réunion has even broken world records for rainfall. The west (leeward) side, protected from the prevailing winds by the central massif is much less rainy, with the lower areas even being semi-arid. The second important factor is relief, which creates an altitudinal zonation giving a warm tropical climate at low altitudes and a temperate one at higher ones, with the possibility of freezing temperatures during the austral winter.

Fig. 4 *Grammitis melanoloma*

Fig. 5 *Cyathea glauca*

the reproductive isolation necessary for the creation of endemic species is less likely to occur.

Fig.3 shows *Ctenopteris argyrata* (= *Ceradenia argyrata*) which is one of the species endemic to Réunion and Mauritius.

Fig. 4 shows *Grammitia melanoloma* which is strictly endemic to Réunion.

The tree ferns (called 'fanjans' on Réunion)

Three indigenous species of *Cyathea*, all endemic, one of which (*C. glauca*) is a strict Réunion endemic, co-exist on the island. If, for various reasons, their presence in low-altitude forests is relatively occasional, at higher altitudes by contrast, they form a significant feature of the landscape. Their density and their height relative to other trees in their vicinity, make the crowns of fronds an impressive sight. The other two species are *Cyathea excelsa* and *Cyathea borbonica* var. *borbonica*.

Fig.5 shows a high altitude landscape marked by populations of tree ferns (*Cyathea glauca*)

Fig.6 shows the frond crown of a 'fanjan mâle' ('male tree fern') *Cyathea borbonica* var. *borbonica*. The species is endemic to Mauritius and Réunion and

A rich biodiversity

The great variety of habitats mentioned above, explains the relative wealth of the flora of Réunion. In spite of its small size and distance from the sources of colonisation (African continent, Madagascar etc...), more than 250 species of ferns and fern allies in about 80 genera are recorded for Réunion. Of this total, more than 180 are shared with Mauritius, which is slightly less rich (about 200 species). Between 180 and 190 species are common to the large island of Madagascar), which has about 600 species.

While the main part of the flora has African/ Madagascan affinities, a minority of species have eastern origins

A notable proportion of endemic species

Of twenty-seven species (and 1 sub-species) endemic to the Mascarenes or shared by Réunion and Mauritius, 17 are strictly endemic to Réunion. To this can be added several varieties. This number does not compare with that of the flowering plants, where about 30% of species are strictly endemic to Réunion. Such a difference is easily explained by the fact that fern spores are so easily transported by air:

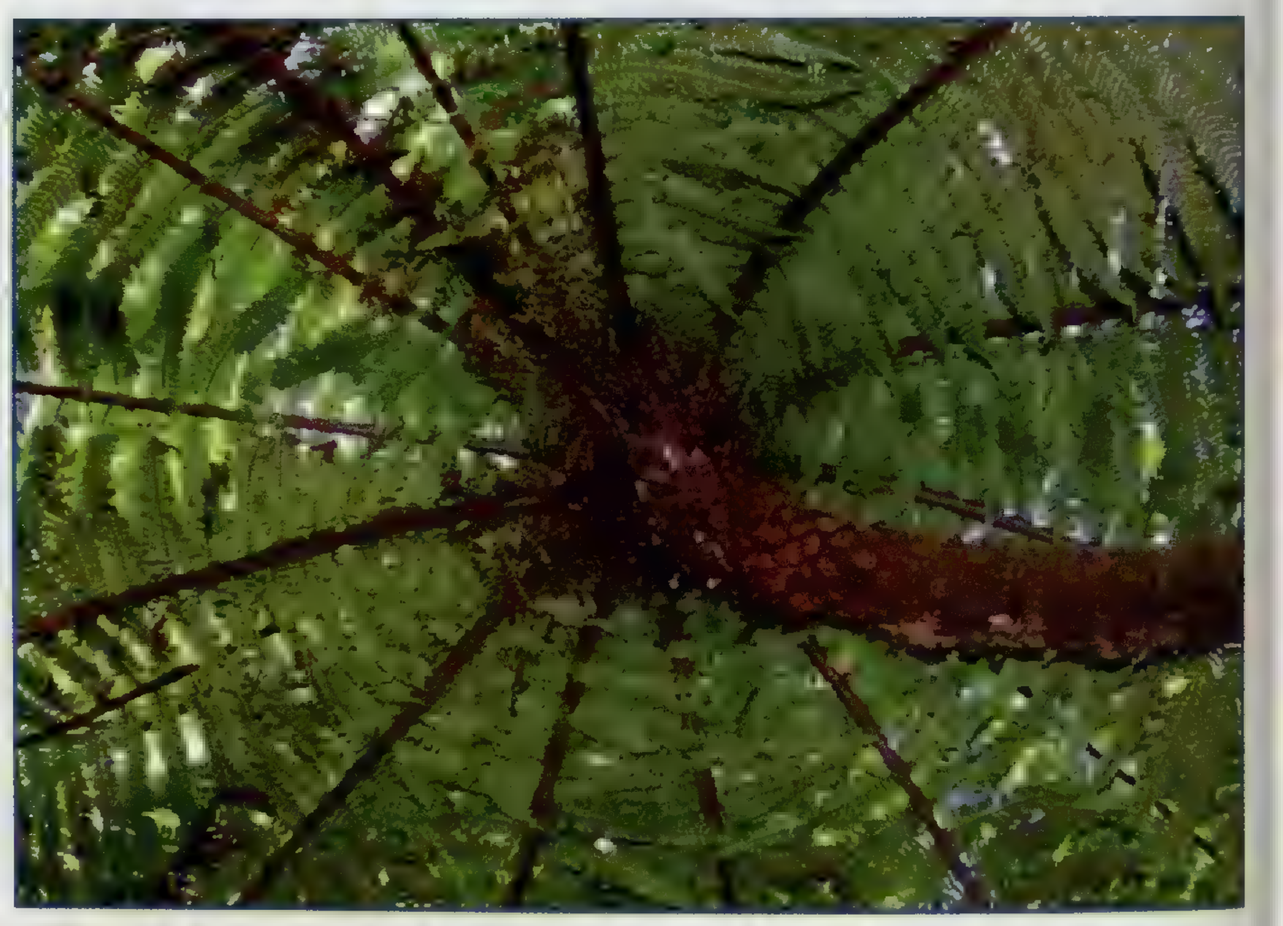

Fig. 6 A 'fanjan mâle' ('male tree fern') *C. borbonica* var. *borbonica*

Fig. 7 View of a path in the forest

the variety endemic to Réunion.

To these three native species must be added an alien, *Cyathea cooperi*. Widely planted as an ornamental plant, it has become extensively naturalised. It is currently the only naturalised fern species which clearly displays an invasive character, the others are much scarcer.

The occupation of different habitats

We have seen that Réunion offers a great variety of habitats ; from coasts to high summits, from dry to very wet areas, and that ferns are present throughout, but in widely differing variety and abundance.

The richest areas correspond to the moist mixed forests of low and medium (termed the megathermic zone) to high altitude forests (termed the mesothermic zone) receiving high precipitation and/or cloud cover (rain forests, cloud forests). Here in the under-storey ferns are naturally dominant, their abundance and diversity diminishes with increasing exploitation by man. In addition the trees are clothed with numerous epiphytic species, among which ferns are a significant component.

Fig. 7 shows a typical path in the forest, whilst Fig. 8 shows the under-storey of a high altitude forest.

The semi-arid areas, and the very high areas offer less biodiversity; lack of moisture and cold being the limiting factors. However there are still quite a few species adapted to these conditions.

Fig. 8 Under-storey of a high-altitude forest

Fig 9 *Actiniopteris australis*.

Fig. 10a (left) *Elaphoglossum stipitatum* & **10b (right)** *Huperzia saururus*.

Fig.9 shows *Actiniopteris australis*, a species of exposed, more or less dry rock faces and constructed walls, which is endemic to Réunion.

Figs. 10a and 10b show two species particular to very high areas: *Elaphoglossum stipitatum* which is endemic to Réunion and *Huperzia saururus*, an indigenous lycopod.

Throughout the world these particular habitats are characterised by related plants and ferns.

Fig. 11 *Ctenitis maritima*.

Fig. 11 shows *Ctenitis maritima*, a species endemic to Réunion and Mauritius, which is essentially confined to coastal zones and tolerates exposure to sea spray.

Fig. 12 shows the 'Grand Etang' which is special for its ring of vegetation mainly consisting of the indigenous fern *Cyclosorus interruptus*.

On the other hand, the clearly aquatic species (*Marsilea, Salvinia, Ceratopteris*) are rarely encountered, and even then mainly in man-made habitats. Their indigenous status has not been clearly established.

Epiphytes

As mentioned above, epiphytic plants are very common in humid forests. They are particularly

Fig. 12 *Cyclosorus interruptus*.

Fig. 13 Clothing of epiphytes in a high-altitude forest.

Fig. 14 *Antrophyum giganteum*.

Fig. 15 *Elaphoglossum splendens*

Fig.16 A 'viviparous' asplenium *Asplenium. daucifolium* var. *lineatum*.

Fig 17 Another 'viviparous' asplenium: *Asplenium boltonii*

Fig 18 *Asplenium stoloniferum* (another 'viviparous' asplenium)

Fig. 19 *Nephrolepis abrupta*.

Fig. 20 *Blechnum tabulare*

abundant in the mixed high-altitude communities where the modest height of the trees favours their existence.

Fig. 13 shows a clothing of epiphytes in a high-altitude forest; several species of ferns and lycopods can be recognised.

The best represented families in this situation are the *Hymenophyllaceae*, the *Grammitidaceae*, the *Elaphoglossaceae* (with the single genus *Elaphoglossum*), the lycopods, with the genus *Huperzia*, and the *Vittariaceae*. There are several other additional species in the *Polypodiaceae*, *Aspleniums* etc..

Fig. 14 shows *Antrophyum giganteum*, an epiphytic Vittariacéae of low to middle-altitude forests, endemic to Réunion (and perhaps Mauritius).

Fig. 15 is *Elaphoglosum splendens*, a species endemic to Réunion and Mauritius, common in the high-altitude forest.

A relatively common phenomenon : vegetative reproduction by bulbils

A good dozen indigenous species and one naturalised exotic reproduce vegetatively by bulbils. There are also several varieties of other species which produce bulbils, of which one, *Asplenium daucifolium* var. *daucifolium*, is endémic to Réunion and Mauritius. These 'viviparous' species vary greatly in size, from the tiny *Trichomanes mannii* (a form of *Crepidomanes minutum*) to the large *Diplazium proliferum* . They also belong to equally diverse genera.

Figs. 16 - 18 shows three 'viviparous' aspleniums.

Pioneer species

La Fournaise (2632 metres) is a permanently active volcano – one of the most active in the world – regularly producing new basaltic (lava) flows, which occasionally reach the sea and enlarge the island by several hectares! There is rapid erosion which gives rise to virgin soil. The plants which colonise these soils are in themselves specialised! Several are ferns. Two of them are presented in the following photographs.

Fig. 19 shows the spectacular colinisation of a recent lava flow at low altitude by the indigenous species *Nephrolepsis abrupta,* one of the first colonisers at this altitude.

Fig. 20 shows the remarkable indigenous pioneer species of mid to high altitude - *Blechnum tabulare*. This species is well represented on certain slopes of La Fournaise, and first observed from some way off by Bory de Saint Vincent (1801), when he was mistaken in thinking they were osmundas. Leading him to name an area of the volcano 'Plaine des Osmondes' (Osmunda Plain). He later recognised his error and named this fern, new to him, as *Pteris osmundoides*. But the name of the area has remained.

The preceding description is only a brief summary of the pteridological wealth of Réunion, an island of contrasting landscapes. Rising tier by tier from 'the beating of the waves to the summit of the mountains', offering impressive, often magnificent sites, and now protected by a recently created 'Parc National des Hauts' (Highland National Park), 'l'Ile intense' (as the tourist guides call it) offers its biological diversity as a bonus to its natural richness. ❐

Fern mirror

Appearing In the last issue of the *Pteridologist* was a photograph of the 'fern mirror' containg the image of a BPS member as he took the photograph.

Readers were invited to guess his identity and provide a suitable caption.

This proved to be very difficult and no-one guessed his identity let alone provide a caption.

The mystery photographer is non other than Adrian Dyer and I must thank him for not releasing his identity, and indeed for the photograph.

Alec Greening

Croziers - a photographic study.

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Dryopteris wallichiana

Athyrium otophorum var *okanum*

Osmunda regalis

Athyrium 'Ghost'

Dicksonia sellowiana

Thyrsopteris elegans

Polystichum setiferum

Dryopteris intermedia

Osmunda regalis 'Cristata'

A fern by any other name

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One of the pleasures of leafing through antiquarian books on plants is that of interpreting their pre-Linnaean Latin names. Ferns, having little other than frond form to distinguish them, are among the most challenging to identify. The common ferns are easiest, because all authors used the same name; bracken, for example, was 'Filix fœmina' [lady fern] from the earliest printed herbals until Linnaeus, perversely some might say, applied this name to an entirely different plant. Sometimes, though, there were nearly as many names as authors to coin them. Once an author had chosen a good descriptive name, it tended to stick. The epithet 'Filix mas non ramosa pinnulis latis, densis, minutim dentatis' [Unbranched male fern with broad, close-set, pinnules having small teeth], coined by John Goodyer and printed in Johnson's 1633 edition of Gerard's *Herbal*, is still a good compact description of *Dryopteris filix-mas*.

Few names are as transparent, and occasionally there are real puzzlers. One of these occurs in Christopher Merrett's *Pinax Rerum Naturalium Britannicarum*, a small octavo volume of 224 pages with the ambitious aim of listing every plant, animal and fossil found in Britain. (If you find a copy dated 1666, hold on to it – almost all that first print run was destroyed in the Great Fire.) I was fortunate recently to acquire a copy of the 1667 reprint, withdrawn from the shelves of Cheltenham Public Library, and naturally turned first to the ferns. Merrett lists about thirty, sometimes with a note of where they are to be found, and my eye was caught by this entry on page 39: 'Filix saxatilis crispa, P.1686 ut opinor, Curled wall fern, over the gate as you go into King-street.' This means that Merrett had seen a fern that he cautiously identified ('ut opinor', in my opinion) as one illustrated on page 1686 of John Parkinson's *Theatrum Botanicum* of 1640. Clearly the site was in London where there are now several King Streets. The date at which Merrett wrote eliminates all but one, namely King Street, Covent Garden, laid out by Inigo Jones in 1632. But what was the 'Filix saxatilis crispa' that grew there? I had not seen this epithet before. The obvious suspects – *Asplenium adiantum-nigrum*, *A. ruta-muraria*, *A trichomanes*, even rustyback *A. ceterach* and hart's-tongue *A. scolopendrium* – could be ruled out as they appear elsewhere in Merrett's list under their own recognisable names. So do others of the group the herbalists called 'stone ferns', such as *A. viride* and *A. septentrionale*. Whatever this 'curled wall fern' was, it seemed to be nothing in the current British flora. This was getting interesting.

Unlike Merrett's *Pinax*, Parkinson's *Theatrum*

Fig.1 Filix saxatilis crispa: woodcut from Parkinson, 1640

Botanicum is a weighty folio tome. Most copies are in academic libraries and I was kindly allowed to consult the copy once owned by John Goodyer himself, in the Library of Magdalen College, Oxford. The relevant entry on page 1044 is as follows, retaining Parkinson's spelling: 'Small curled Stone Ferne. Filix saxatilis crispa of Pona, in the description of Mount Baldus. This small curld Ferne hath a roote composed of many blackish threds or fibres, growing from above, whence spring up small stalks, scarce an hand breadth high, set on both sides with tender soft strings of very small leaves so finely divided and dented, that they seem curld, of a darke greene colour upwards, and paler below towards the bottome, having reddish or brownish dust-like spots on the backside as the Miltwaste [rustyback] hath, the figure hereof is by chance left out, you shall find

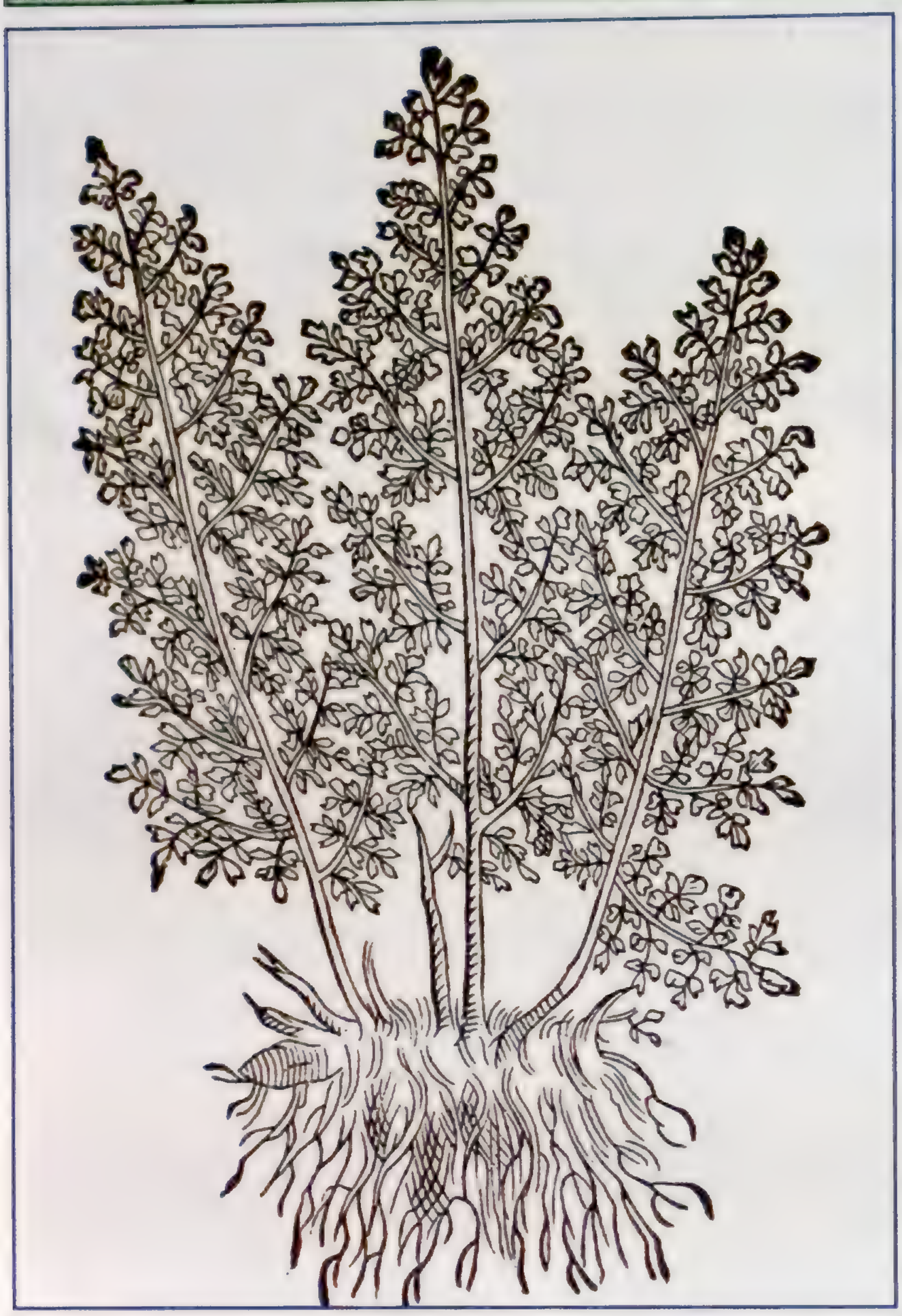

Fig.2 Filix saxatilis crispa: woodcut from Pona, 1608

Fig.3 Filix [Filicula] saxatilis ramosa maritima nostras: collected by Blackstone, ca. 1735

it in the Appendix.' And indeed you do, on page 1686 as Merrett noted – see fig.1 above. The woodcut of a tripinnate plant with small pinnules is not very revealing, except to eliminate all likely spleenworts and similar ferns.

Parkinson's reference was to an account by Giovanni Pona, an apothecary of Verona, of plants found on Mount Baldus, a rich botanical site on the shore of Lake Garda. There are two editions, both extremely rare, of Pona's *Plantae ... quae in Baldo Monte et in via ab Verona ad*; Magdalen College has both, which I was able to examine. I found what I was looking for on page 100 of the second edition of 1608. Pona says he was walking along a narrow, well-vegetated gorge on the east flank of the mountain, where the plants were, with one exception, those he had already seen, or described elsewhere. The exception was 'Filix saxatilis crispa'. Pona gives a description in Latin, of which Parkinson's is almost a word-for-word translation, and a woodcut illustration (Fig.2) that Parkinson also appears to have copied. And Pona hazards a guess at its identity – 'forte [perhaps] Pteridion fœmina', he writes. This is the name used by the German botanist Valerius Cordus in 1561 for what we now call oak fern, *Gymnocarpium dryopteris*. Pona's illustration looks nothing like this, nor would I expect to find it in a London street. The trail had gone cold.

I decided to give up working backwards from 1667, and to go forward instead. When Merrett's *Pinax* was published, England's greatest botanist, John Ray, was already at work. His *Synopsis Methodica Stirpium Britannicarum*, an account of the British flora far more comprehensive and detailed than Merrett's, was published in 1690, with a second edition in 1696. A third edition with substantial additions by John Dillenius, first Professor of Botany at Oxford University, appeared in 1724, after Ray's death. This proved so popular and widely sold that even I could afford a copy when one came on the market, and here I found the answer.

'Filix saxatilis crispa, Small branched Stone-fern' appears in all three editions. In 1696 Ray added a second name, 'Filicula saxatilis ramosa maritima nostras'. His description, in Latin and English, reads: 'Ad littus Angliæ Occidentale rupibus maritimus adnascentem observavimus [We recorded it growing on maritime rocks near the coast of western England]. It hath been found on some Walls at Westminster, and in Grays-Inn Walls by Mr. Dale.' Thus its presence on London walls was confirmed, and a coastal habitat mentioned, but there is no further information. However the third edition of Ray has an additional

statement (in brackets, showing it was added by Dillenius): 'In horto medico Chelseano in muro consita, post annum unum aut alterum radices in terram fixit, quæ Filicem fœminam Ger. produxere, adeoque ejus saltem varietas est.' [This, growing in the wall of Chelsea Physic Garden, and having been planted, gave rise, after one or two years with its roots in the soil, to Gerard's Filix fœmina, of which it is doubtless a different form].

'Filix fœmina', as mentioned earlier, was the accepted name for bracken, *Pteridium aquilinum*. What Dillenius showed was that 'Filix saxatilis crispa' is just a juvenile plant of bracken, whose sporelings often have an attenuated and delicate form, and when growing on walls may never develop further. Even after 1724, competent botanists continued to treat 'Small branched stone fern' as a distinct species. A specimen collected in the 1730s by the apothecary John Blackstone, and identified by the name Ray gave it, is in the NHM herbarium (Fig. 3). However by the time of Linnaeus, 'Filix saxatilis crispa' and 'Filix fœmina' were recognised as the same, though juvenile plants are still occasionally collected as curiosities. In 1853 the magazine *Phytologist* carried a note 'Uncommon state of *Pteris aquilina* at the Public Baths, Coventry'; Fig.4 shows a sheet of plants collected from that site. Mistakes are still made and I'm not ashamed to admit that when I began studying ferns, I too was misled by a juvenile bracken frond on a London wall (Fig.5) into thinking I had an exciting discovery; Alison Paul at the NHM put me right. Merrett's confusion is understandable but history has vindicated him and in Kent's *Historical flora of Middlesex* (1975) he is credited with the first county record of *Pteridium aquilinum*, despite his having no idea that the fern he saw on a London wall was common-or-(Covent) Garden bracken.

One question still troubled me – was this really the plant Pona saw in Italy? I found the answer in Gaspard Bauhin's *Pinax* of 1671, an encyclopaedic concordance of some 6000 plants and their pre-Linnaean names. During the 1930s the Librarian of the Linnean Society, Spencer Savage, identified nearly all of these and wrote their botanical names in an interleaved copy of the *Pinax*, which he presented to the Society. On consulting it, I found that Bauhin considered Pona's 'Filicula saxatile crispa' to be the plant he himself called 'Filicula alpina crispa' and Cordus had named 'Pteridion' (not 'Pteridion foemina' as Pona thought). Savage was in no doubt as to its identity – it is parsley fern, *Cryptogramma crispa*, which is certainly found in the Italian alps and which Pona's figure plausibly represents. Ray may not have been aware of this, since his name for parsley fern is none of these, but 'Adiantum album crispum Alpinum', coined in 1600 and used by Gaspard Bauhin's younger brother, Jean, in his influential *Historia Plantarum* of 1650.

So 'Filix saxatilis crispa' was parsley fern in Italy but became bracken in England. Linnaean names are less confusing but the older ones are sometimes more interesting! ❐

Fig.4 Pteris aquilina [Pteridium aquilinum]: collected by Kirk, 1854

Fig.5 Juvenile bracken frond found on a London wall.

Figs. 1 and 2 by kind permission of the President and Fellows of Magdalen College, Oxford

Figs. 3 and 4 © Natural History Museum

Tree-Fern Newsletter No. 15

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TFNL then and now

Fourteen years ago the BPS *Bulletin* [1995, Vol. 4 (6): 275] reported the birth of 4 Special-Interest Groups (SIGs) within the Society. Apparently intended mainly for horticulturalists, the SIGs were for: *Aquatic Pteridophytes, Filmy Ferns, Foreign Hardy Ferns,* and *Tree Ferns*. Each SIG was set up with a convener and a small allowance for expenses, but with no particular remit as to expectations and outputs. As often happens with new ventures, the initial enthusiasms proved difficult to sustain, especially in competition with other demands on ferny time. One by one the Groups eventually folded and only the Tree-Fern SIG (TFSIG) survived into the new Millenium.

The first *Tree-Fern Newsletter* (TFNL) was issued in 1996 by Martin Rickard as the founding convener of the Tree-Fern SIG. In 1997, on his election as President of the BPS, Martin asked me to take over the tree-fern convenership.

Thereafter the production of an annual Newsletter was what I was able to do and did. In hindsight, much more should have been possible, but I was never overwhelmed by inputs. Being convener meant, to a large extent, playing in a one-man band.

We did, however, in 2003 organize an all-day *Mini-Symposium on Tree Ferns* at the Kew Herbarium, and also conducted a *Survey of the Tree Fern Species in Cultivation* by Group members in the UK. This was unusual in its quantitative recording of failures as well as successes.

The BPS Committee accepted in 2002 that the TFNL should be made available to BPS members generally and not restricted to the SIG. Thus at No. 8, the issues of this Newsletter ceased to be produced in a few dozen copies on my desktop printer and instead were distributed as a regular section within *Pteridologist*. That journal meanwhile had morphed into A4-format with full colour (as had already happened with the TFNL).

Garden centres and specialist fern nurseries show that there is still much interest in tree ferns. However, during the past 2 years I could find no one willing to be a new convener of TFSIG after my 12-year stint. The BPS Committee accepted therefore that the Group should be discontinued.

Tree ferns will no doubt continue to amaze, delight and sometimes exasperate those who encounter them. Future issues of *Pteridologist* will surely contain articles on tree ferns, but maybe not in a 'Tree-Fern Newsletter'.

To paraphrase the last couplet of Shakespeare's 18th Sonnet:

So long as men can breathe and eyes can see, so long will tree ferns be fronded, with trunks that are taller than thee!

Courtyard Haven for Tree Ferns

Fig.1 Internal courtyard of the administration building at the RBGE, showing four of the five *Dicksonia antarctica* which were the subjects of this investigation. An electric thermometer is just visible as a small white rectangle near the lower left corner of the right-hand window.

Back in 2002, I was very surprised to see, at the Royal Botanic Garden Edinburgh (RBGE), 5 trunked *Dicksonia antarctica* doing well in a courtyard (Fig. 1) that was open to the sky. This exposed the ferns to radiative frosts on clear winter nights. Yet the tree ferns were never winter-wrapped; they relied for frost protection purely on the local micro-climate. The fronds stayed winter-green.

The courtyard is located within the administration building at the RGBE and is not generally open to the public. This is because the only access is through the glass door of a ground-floor committee room, where there are frequent meetings. On enquiry, I found that the *D. antarctica* had previously been pot-grown under heated glass and then planted in the ground of the courtyard a year or two previously. Their original provenance was New South Wales. The trunks ranged in height from 67 to 180 cm and in diameter from 21 to 29 cm.

As shown in Fig. 1, the courtyard has numerous

windows. They were not double-glazed, so escape of heat from the buildings would have been considerable. Also the walls surrounded the courtyard had no gaps, a feature that further helped to create a pocket of benevolent micro-climate, separated from the outside. For me, the main questions were: how low did the winter temperature go within the apical cleft of each tree fern; and how did these temperatures relate to those of the courtyard air and at the official weather station in the main botanic garden?

To cut a long story short, I found that staff at RBGE were very willing to allow individual electric thermometers to be installed within the apical clefts of each of the 5 courtyard ferns. Not only that, but two staff members, Louise Galloway and Andy Ensoll, volunteered to take and record the weekly readings of the minimum and maximum apical temperatures and the courtyard-air temperatures. This was done between November and April of the winter of 2003-2004. A detailed report of the work was published in *Sibbaldia* (Wardlaw *et al.*, 2005).

Fig. 2 summarises the weekly-minimum temperatures in the individual tree-fern apical clefts, and shows that there was little systematic variation between plants. On no occasion did the *average* apical cleft temperature of the 5 plants go below 0°C. This is also shown by the top graph-line in Fig. 3. However, there were 3 occasions when the temperature within (different) *individual* apical clefts dipped below 0°C, the minima reached being -0.2, -0.3 and -0.8°C.

Fig. 3 compares the average weekly-minimum temperatures inside the apical clefts with the temperatures of the courtyard air and at the weather station. In late December the average minimum courtyard-air temperature dipped to -2.7°C, the apical mean being +0.2 °C. Meanwhile outside the courtyard, in the main botanic garden, the thermometer in the Stevenson screen registered a winter minimum air temperature of -7.1°C, while the minimum 'grass' temperature went down to -11.2°C. The 'grass' temperature is presumably close to what the apex of an untrunked fern could experience in an unsheltered place in the main botanic garden.

These studies not only provided data on winter temperatures within tree ferns, but also illustrated the extent of natural heat-insulation provided in *D. antarctica* by the thick wall of tissues surrounding the apical cleft. The data also illustrate the beneficent micro-climate in a courtyard that is completely surrounded by heated buildings.

In a later investigation, other species of tree fern were planted in the courtyard and had their apical temperatures recorded during the winter of 2004-2005. Apart from the *D. antarctica*, all the species in this later study were given winter wrapping around the trunk and apex. They all survived. These later species were *Culcita macrocarpa, Cyathea dregei, Cyathea smithii* and *Thyrsopteris elegans*.

Full particulars of wrapping and temperatures are given in the report by Ensoll *et al,* (2007).

Temperature records at the RBGE weather station showed that the two winters studied were unexceptional for the 21-year period 1984 – 2005.

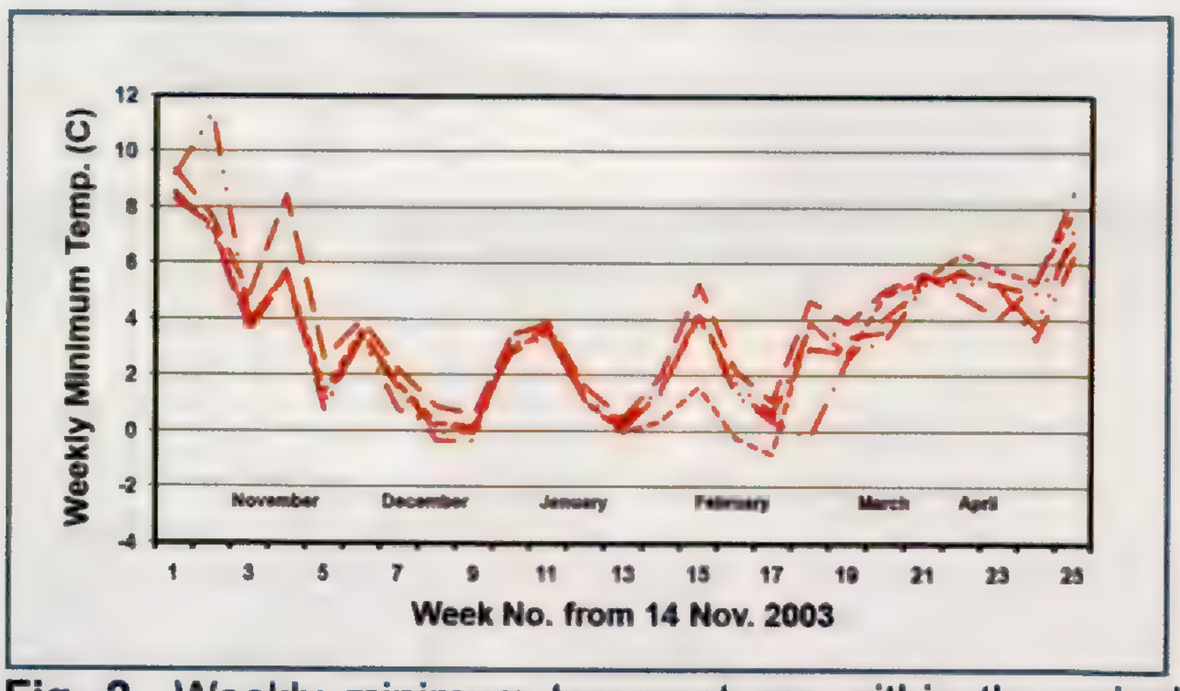

Fig. 2 Weekly minimum temperatures within the apical clefts of individual tree ferns in the courtyard at RBGE, showing winter weekly-minima and the between-plant variation.

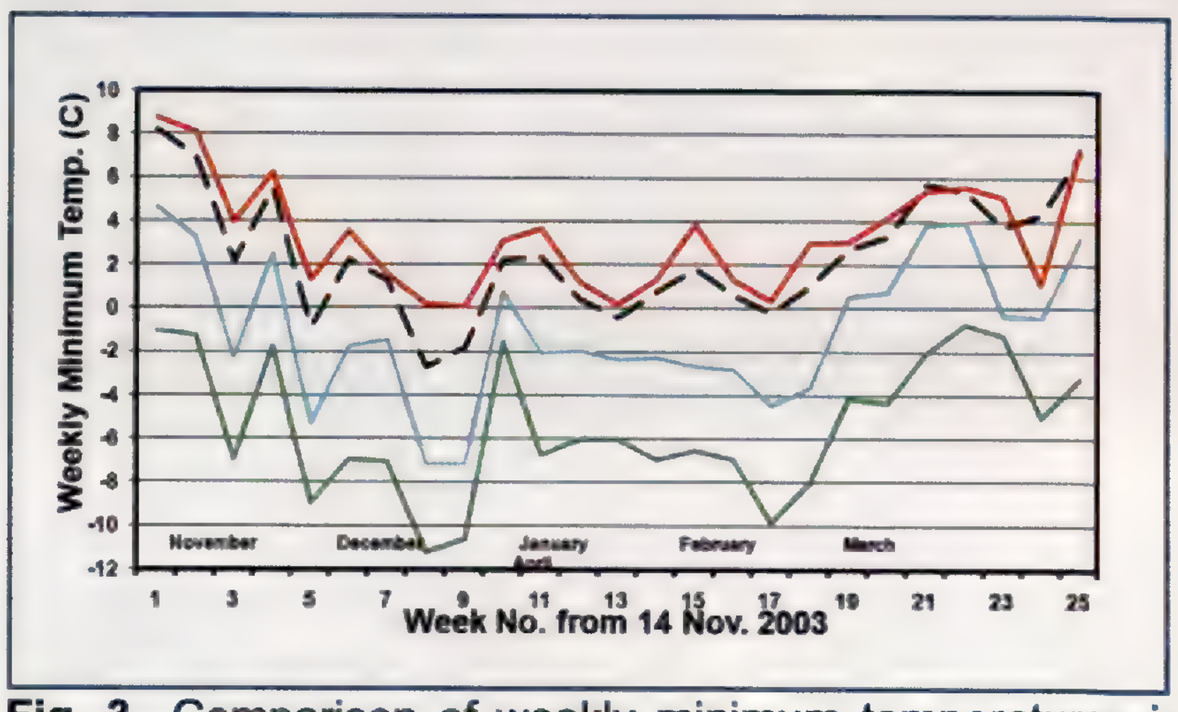

Fig. 3 Comparison of weekly minimum temperatures in various locations at RBGE during the winter of 2003-04. Red = average of 5 tree-fern apical clefts; black dashed = average of 5 locations of courtyard air; pale blue = weather station 'screen'; green = 'grass' at the weather station.

Acknowledgements:

I am very grateful to staff at RBGE for making this project possible, and for doing most of the work!

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ACW ❐

Bulbils on Tree Ferns: II

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Last year I reported (Rickard, 2008) the occurrence of bulbils on all three species of tree fern native to the Island of Réunion in the Indian Ocean. These were the first bulbils I had ever seen on any species of tree fern anywhere.

Fig.1 Base of trunk (yellow arrow) of *Alsophila firma* with stolon (red arrow) emerging horizontally and, after bending towards the ground, bearing an upward uncurling crozier at its tip (blue arrow).

Alsophila firma in Costa Rica

Visiting Costa Rica with the BPS group early in 2008, I was surprised to see nodules, or more properly stolons (i.e. above-ground horizontal shoots), frequent on the side of the trunk of one of the native Costa Rican tree ferns, *Alsophila firma* (Figs. 1, 3). This is a deciduous species, typically growing at median altitudes in open spots in wet tropical rain and cloud forest. We saw it mainly at about 1600 metres.

At the time of our visit, before the season had really begun, croziers were waiting to start growth simultaneously from a very striking cylindrical crown, equating with the top 10 cm or so of trunk (Fig. 2). Lower down the trunk, below the point of production of the previous season`s fronds, more 'crozier-like' protuberances were often present. They were not really croziers, but stolons. They seem to sit there largely dormant (Fig. 3).

Stolons, confusingly also known as *bulbils*, are well known on this species. Alexander Rojas reported "*A. firma* sometimes with bulbils on the side" (of the trunk). Stolons on *A. firma* are usually small, round, up to 3 cm in diameter. They differ in several ways from the bulbils on the Réunion species. In particular i) they do not look like a rosette of fronds about to burst into life; ii) they are certainly not as wide as the main parent trunk; iii) they do not narrow at the point of attachment to the parent trunk and iv) they cannot easily be detached.

Stolons near the base of the trunk of older specimens can occasionally be elongate (Fig. 1), perhaps due to dilution of apical dominance. These elongate stolons do, in fact, look like the beginnings of a new trunk and once or twice I was able to make out a new terminal crown. Curiously they grow out from the trunk *towards* the ground (Fig.1). After much searching and looking at many dozens of plants in the forest in and adjacent to the Jardin Botanico Wilson near Cruces I only found one of these side trunks producing a frond.

Fig.2 Crowns of *A. firma* about to start a new season's growth.

Stolons are very firmly attached to the trunk and dangerously spiny. Some can be detached with great difficulty by hand (wearing thick gloves) but most would need an axe or saw. During our visit I saw some stolons which had been detached by hand. They showed no sign of roots or of croziers waiting to shoot. The surface at the point of breakage looked unpromising, not running with sap. It was dry and of a

dull yellow colour – as if going moribund.

I was also fortunate to see detached stolons planted in ericaceous compost. Some had been treated with rooting powder and some untreated. Amazingly, two grew – those without hormone treatment (Fig. 4). Each of these active stolons had produced only one frond after 9 months but an additional new crozier

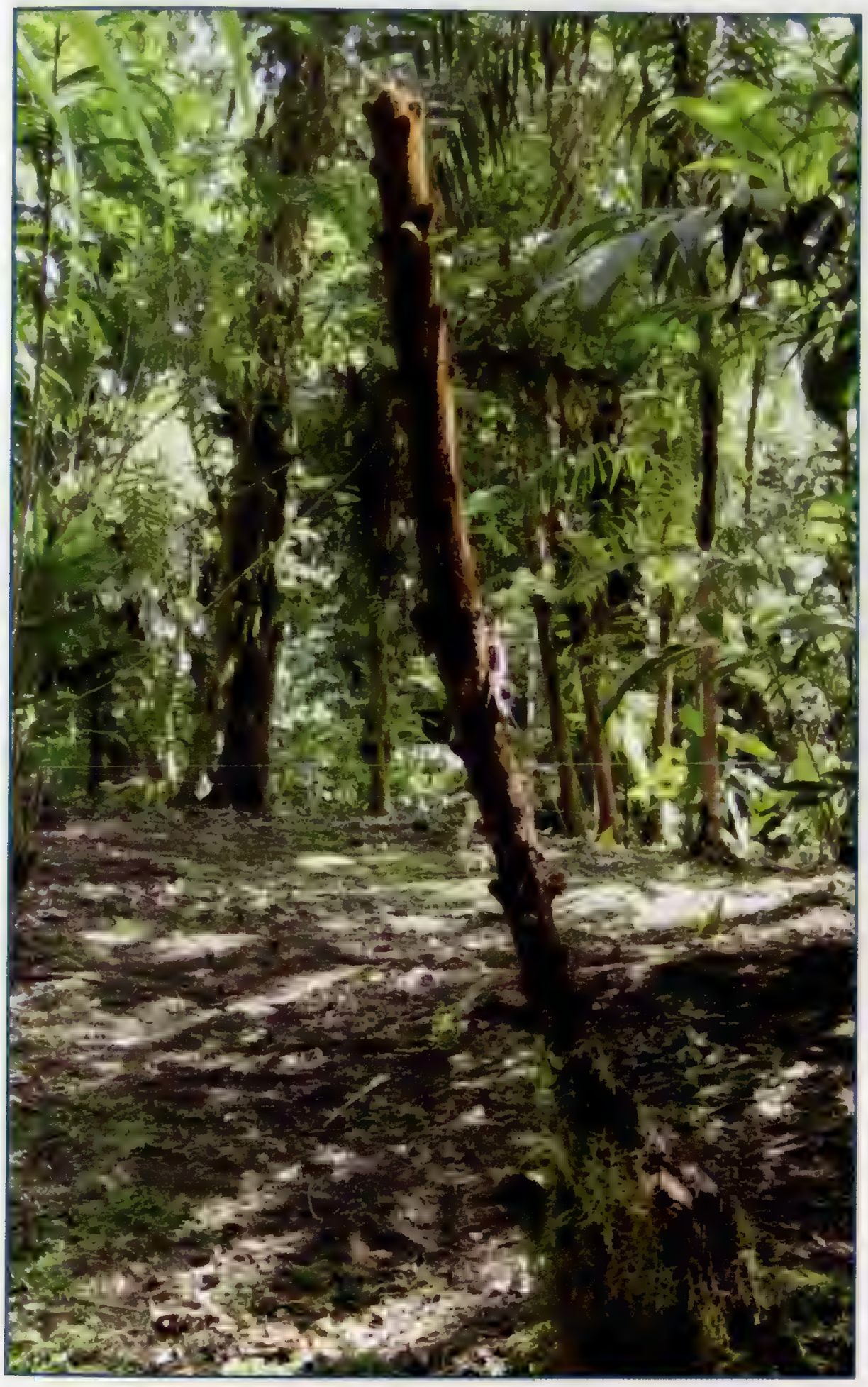

Fig. 3 Stolons distributed up the trunk of *A. firma*.

became visible in one pot. Both of these stolons that grew produced a good crop of roots.

A few stolons were found on another species, I believe *Alsophila erinacea*. A detached stolon was planted without rooting powder but did not produce any fronds. Eventually, however, it did generate some roots, which subsequently dried up and the tissues may now be dead.

Discussion

Why do these plants produce stolons? The tree ferns themselves are moderately rapid growers, an average of 17 cm of trunk per year has been recorded (Mehltreter, 2008). Most of the trunks we saw could therefore be less than 20 years old. Trunks are slim and perhaps snap in gales. Once the main crown is gone, apical dominance would be broken and new replacement trunks might grow from these normally-dormant stolons lower down the trunk. The trunks look

Fig. 4 Frond produced by a planted stolon detached from the trunk of an *A. firma*.

as if they would be rather brittle. Moreover, breakage near ground level may be quite common since multi-stemmed 'clumps' of trunks were noted.

Light at ground level in dark forests is dim and, on the forest floor, there is much competition for space and light from large-leaved herbaceous plants. In such habitats a fern spore can land on bare ground, leaf litter, fallen logs, rocks, tree trunks, etc. The best surface for tree ferns to establish and grow to maturity is bare soil, usually only available following disturbance. Here there may be sufficient light and adequate soil for roots to penetrate. On the other surfaces small gametophytes and sporophytes may establish but might have difficulty maturing.

If there is no disturbance, how does *A. firma* reproduce in the crowded forest? The production of stolons is a possible strategy. On the living *A. firma* the stolons seemingly do not detach and fall to the ground; nor do they grow readily while attached to the living trunk. However, if the main trunk is damaged, and the apical dominance of the main crown is broken, the stolons may sprout. As reported above, the stolons are very firmly attached to the trunk and (apparently) would never simply fall off. But if a section of trunk were to break away and fall to the ground it is possible these stolons could grow while still attached to the trunk. Disappointingly, I found no evidence of such a process but cannot rule it out. ❐

Acknowledgement

I thank Dr. Klaus Mehltreter for help with the preparation of this paper.

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Gough-Island Tree Fern Comes to Scotland

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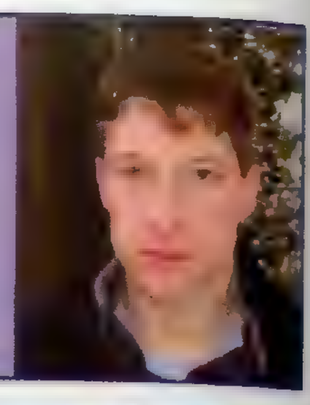

Fig 1 Tussock-grass hillside on Gough Island, with an abundance of trunked *Blechnum palmiforme*. These and all the other pictures from Gough Island were made available to me by Niek Gremmen to whom I am very grateful.

Fig. 2 Aerial view of Gough Island.

Gough Island: general

Blechnum palmiforme (Fig. 1) is as evocative of Gough Island as the thistle is of Scotland. The island is part of the *United Kingdom Dependent Territory of Tristan da Cunha*, which includes Tristan as the main island of the group, together with the uninhabited islands of Inaccessible and Nightingale. Gough has permanent habitation of about 6 people at its weather station which is run from South Africa (since 1956). Amazingly on the web, one can get information about the daily weather on Gough as well as a forecast.

Gough is at latitude 40° 20' South and longitude 9° 54' West and is literally 'in the middle of nowhere'. It is 2700 km from Cape Town and 3200 km from the nearest point in South America.

The island is about 65 sq. km in area and is surrounded by steep cliffs (Fig. 2). Edinburgh Peak at 910 m is the highest point. *B. palmiforme* on Gough grows at least up to 530 m altitude. Fig. 3 shows an isolated and stunted specimen in the high grassland, with snow close by. Fig. 4 is another picture of *B. palmiforme* with snow.

Fig. 3 Isolated and stunted specimen of *B. palmiforme* in high-altitude, boggy grassland on Gough Island.

Fig.4 Snow on *B. palmiforme*

Climate

Gough Island has a cool-temperate oceanic climate. In July, the coldest month, the monthly average min. and max. temperatures are 7 and 12°C respectively. In February, the warmest month, the corresponding figures are 12 and 18°C. The annual mean temperature at sea level is 11.3°C, with little seasonal variation. Extreme temperatures at sea level have ranged from -3°C to 25°C. The mean relative humidity is 80%. Snow is likely to fall on the higher ground between May and January each year, but rarely at sea level. Mean annual precipitation near sea level is in the range 2400-3100 mm. The cloud base is typically between 300-500 m, although it occasionally descends to sea level. Gales blow on 5% of summer days and on 15% of winter days.

Trunk and frond size

I was fortunate a few years ago to make contact with Niek Gremmen who was doing botanical conservation work on Gough Island at the time. Not only did he provide numerous pictures of the island and of the *B. palmiforme*, but he also measured and recorded trunk heights and frond lengths in relation to altitude. Fig. 5 is a plot of these data from sites where the *B. palmiforme* was locally abundant, at altitudes of 62, 145 and 502 m above sea level (ASL). It is interesting to compare plants from the two lowland inland sites. Despite being at the somewhat greater altitude of 145 m, the more inland site has plants with greater frond length than the ones from 62m above sea level. Perhaps there is more shelter at this site from gales. Note that as the altitude increases, the average trunk height diminishes.

Niek Gremmen reported; 'Lowland tree ferns are usually roughly 1-meter high (50 -100 cm), and may often rise above surrounding vegetation; young ones obviously are much smaller. In upland areas the plants are much shorter and only in sheltered spots rise up over the surrounding moss/grass vegetation'.

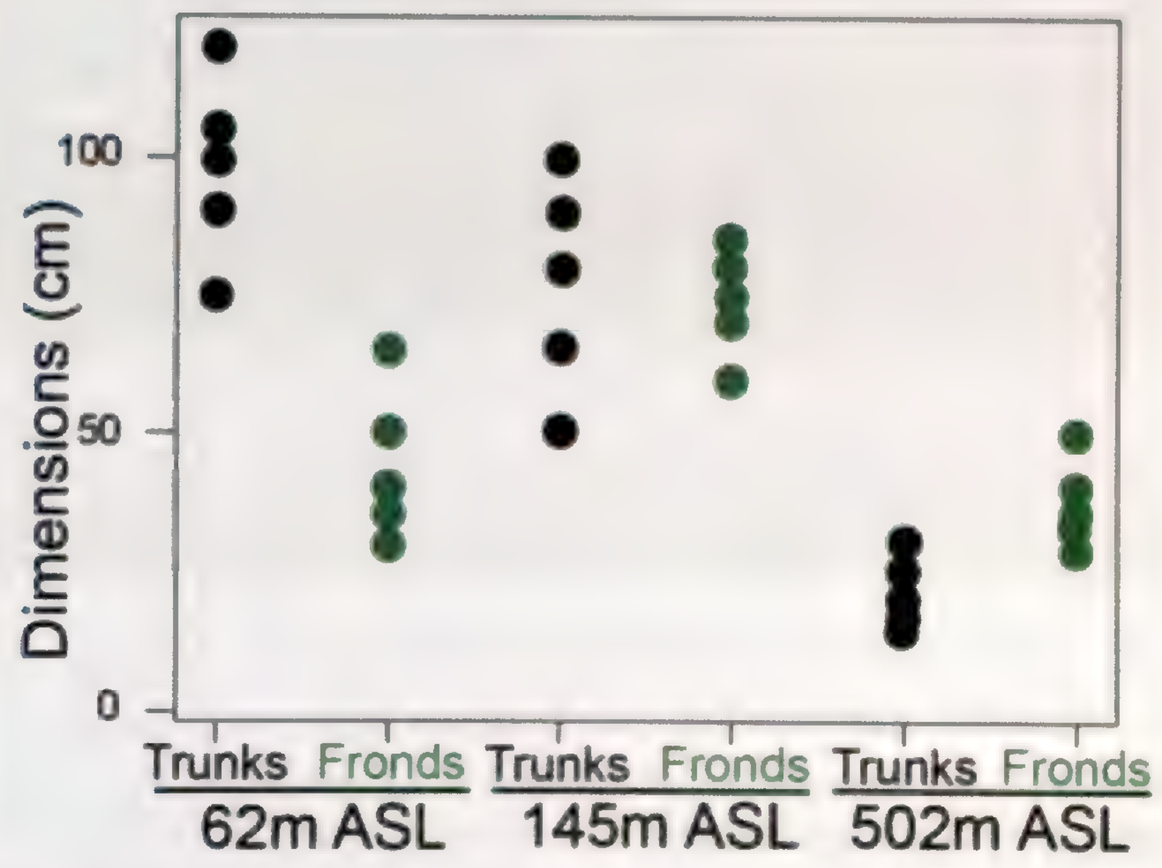

Fig. 5. Dimensions of trunk height (black) and maximum frond length (green) of 5 randomly-chosen *B. palmiforme* specimens at sites that were 62, 145 and 502 m above sea level (ASL).

The site descriptions by Niek Gremmen were:

62 m ASL: Between the weather station at Transvaal Bay and the helicopter platform, a small dense stand of *B. palmiforme* with *Elaphoglossum laurifolium*;

142 m ASL: Inland from the weather station, a small dense stand of the tree ferns on the lower slope of the hill;

502 m ASL: Goneydale, near campsite; isolated ferns in upland grassland.

Spores of B. palmiforme

After my getting official permission from the Governor of Tristan da Cunha, Niek Gremmen collected portions of fertile fronds of *Blechnum palmiforme* from 4 sites on Gough Island and sent them to me. Two of the sites were 'lowland' i.e. at 62 and 145 m ASL, while the other two were 'upland', namely at 502 and 530 m. The last-mentioned was not included in the trunk and frond survey because of time constraints in the field work.

My aims are to compare the growth and hardiness of the *B. palmiforme* i) from the lowland and upland sites on Gough island, and ii) with the related species of *Blechnum* from South Africa and South America which are already established here at Linn Botanic Gardens. I now have a large number of young plants of *B. palmiforme* from all 4 sites, together with some stray plants of *Histiopteris incisa* (Fig. 6).

Flora of Gough Island

Fig. 6 *B. palmiforme*, with the bright green *Histiopteris incisa* in the fore-ground and the shrub, *Phylica arborea*, in the background.

Fig. 7 Atlantic yellow-nosed albatross ('Molly') nesting on the decomposed crown of a *B. palmiforme*.

Fig 8 End of the life cycle of *B. palmiforme* on Gough Island: the decomposed stump may serve as the nest of an albatross.

The native flora of Gough Island has about 30 species of fern, including 3 blechnums, additional to *B. palmiforme: B. australe, B. penna-marina* and *B. punctulatum*. They are described in *Gough Island - A Natural History* by C. Hanel *et al.* (2005, Sun Press, 169 pp.) Also dealing with Pteridophytes is the *Field Guide to the Animals and Plants of Tristan da Cunha and Gough Island*, ed. P.G. Ryan (2007, Pisces Publications, 168 pp.). This latter book was reviewed by Graham Ackers in last year's *Pteridologist* (2008, Vol. 5(1): p. 3).

End of *B. palmiforme*

As shown in Figs. 7 and 8, the fate of large *B. palmiforme* on Gough Island is sometimes to become nest sites for the local albatrosses.

Acknowledgements

I am indebted to the Governor of Tristan Da Cunha for permission to collect spores of *Blechnum palmiforme*. I warmly thank Niek Gremmen for collecting the spores and for providing records and all the photos used here. ❐

Growing ferns in a challenging climate

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(Editor`s foreword: Since writing this article Tim has experienced weather as cold as any recorded over the past 20 years. By chance I visited his garden on the 1st February 2009 and was able to take some post-freeze photos. These are added here, usually alongside the same plant photographed on the 26th September 2008. All the photographs were taken by me. MR.)

When I first became interested in ferns in the early 1980's I soon became aware that South-east Essex is far from the ideal location for growing them successfully. Coastal Essex in particular is one of the driest and warmest areas of the country. According to the Met Office, St. Osyth on the North-East Essex coast is the driest place in the country, with annual rainfall averaging just 513mm. Not only is the area dry but the Thames Estuary is also one of the hottest regions in England. Not surprisingly humidity is also extremely low. I soon realised that trying to grow *Athyrium* and *Dryopteris* successfully was not as easy as many books indicated.

However all was not lost. I had already discovered that gardening literature tends to be overly pessimistic when considering cold hardiness. I began experimenting with tender ferns as well as many other plants, especially those from Australia and New Zealand and soon found that many thrived in the Essex climate. Providing the plants survived the rigours of winter the hot, dry conditions suited many woody species. Although coastal Essex is not as balmy as the British west coast, the ameliorating effect of the sea is usually sufficient to prevent temperatures from dropping lower than -8°C. The last exceptionally cold and damaging winter in this area occurred in 1986/87 and since then there has been a sequence of relatively mild winters through which I have experimented with a wide range of so-called tender ferns. I moved into a new house in 1988 and built up large collection of fern species. In 2007 I moved again and have started to create a new garden (Fig.1) although I have brought some of my best ferns with me.

Over the years of trial and error I have learned that a few requirements are essential for the successful outdoor cultivation of the less hardy ferns.

Fig.1 General view of garden 1.2.09 (for our American friends this is the Ist Feb, not 2nd Jan!)

1. Drainage.

Wherever possible tender ferns should be grown in raised beds (Fig.2) or troughs. This helps to remove excess moisture in winter that can freeze and cause physical damage to the rhizome. The rhizome is then prone to rotting and loss of the growing point even in ferns that normally grow in wet conditions.

Fig. 2 The shadiest of the raised beds, 26.8.08

2. Soil.

My soil is mostly a silty clay. Essex clays tend to dry out completely during the summer. The fern root zone may survive but the fern fronds tend to suffer badly and look awful. I find that growing ferns in raised beds can allow a thick layer of humus rich compost to be laid over the clay that helps to ensure that the clay stays damp, allowing moisture and nutrients to be absorbed. The loose compost also helps to allow rain from summer storms to be absorbed rather than running off the surface. In winter the compost allows better drainage, so preventing water logging. I find well composted bark to be a very effective mulch. I also shred and compost all my prunings which are spread over the soil each autumn and this has greatly improved the soil composition.

3. Shelter.

By this I mean protection from continuous bright sunshine in summer and cold winds in winter. Shade should be light and if provided by trees or shrubs should not be of species that compete aggressively for moisture. My main fern beds were on the north side of the house and during summer the building shaded the ferns apart from early morning

and evening. Also around the middle part of the day in midsummer the bed would be exposed to bright sunlight. However the ferns never suffered as the period was relatively brief. My new garden has very little shelter and shade at present which has been very challenging. The last two summers may have been poor but the relatively cool and cloudy conditions have helped with the establishment of my ferns.

4. Irrigation.

I have tried to water as little as possible and it mainly consisted of occasional damping down of the fern areas during the evening in long dry periods. Fortunately most dry spells are broken by heavy thunderstorms that supply a large amount of water. If the soil surface is not too dry or compacted a lot of this rainfall penetrates into the ground. To help this I tread on the soil as little as possible and stick to paths between the beds. In my new garden I have installed leaky hose irrigation in my raised beds. This can be turned on in the evening and will feed water to the roots without too much loss through evaporation. Needless to say I have hardly used it during the last two summers.

Using these methods I have been able to grow a wide variety of ferns. I have found that many ferns from the southern hemisphere thrive whereas those that originate from Europe and North America may fail to perform well through the summer. Many ferns from East Asia and Japan also cope well with the conditions. Although many of these ferns come from areas of high rainfall they seem better adapted to cope with high temperatures and low humidity, at least for short periods. The high summer temperatures also help toughen the plant tissues enabling the ferns to survive brief cold spells through the winter.

Ferns

Here I provide details and thoughts on a few of the ferns that grow in my garden. I have chosen ones that I particularly like and/or have proved easy and dependable. They have grown consistently well in hot, dry conditions with minimal water, sometimes for several weeks, and have also survived a number of winters outside. I do not provide protection for my ferns so they have to survive only through their innate toughness and by the creation of protective microclimates.

Fig.3 *Ampelopteris prolifera*. Camouflaged among other ferns but one horizontal frond can be seen dipping down to the bottom right of the photograph. 26.8.08

Ampelopteris prolifera (Fig.3)

I have included this fern despite only trialling it through two (comparatively harsh) winters. It produces long, pinnate, matt green fronds that do not seem to cease growing. These tend to sprawl over the ground but I find them rather attractive as they suddenly emerge unexpectedly through a shrub or nearby fern. They reach up to 1.5 metres in length and if not stopped by cold weather would continue growing. I was initially sceptical that it would survive British winters as it grows naturally throughout the old world sub-tropics, but was assured by Andrew Leonard that it was quite tough. It was a great surprise when the seemingly dead plant sprung into life after the 2007/8 winter when -6°C was recorded. Proliferous buds occur sporadically along the rachis and these develop into plantlets that root if they touch the ground. These can easily be detached and grown on as an insurance against the loss of the parent plant. They are fast growing so a large plant can quickly be grown in one season.

Arachniodes aristata

Forms a slowly expanding colony due to creeping rhizomes. The fronds are 30 – 40cm long, evergreen, rather glossy and have spiky appearance as the pinnule teeth are long aristate. The fronds resemble a broad, finely divided *Polystichum* and never seem to suffer from heat. Hard frosts can damage fronds but these are quickly replaced in the spring. The unfurling fronds are covered with pale grey scales. It is found naturally over a vast range from Japan to New Zealand and some provenances will be hardier than others.

Several other species of *Arachniodes* appear to be hardy but none seem to perform as well as this.

Asplenium

I grow many species of *Asplenium*. Most are interesting and rather small but a few are really outstanding.

A.appendiculatum (Fig.4)

Better known as *A. terrestre*, I obtained my plant from Graham Hutchins about 20 years ago who had collected it in New Zealand. It forms a small crown of leathery, 2-3 pinnate fronds up to 25cm long. The fronds are rather upright but droop towards the apex giving a rather elegant appearance. My plant grows in a sink that gets

Fig.4 *Asplenium appendiculatum*. 1.2.09

watered twice weekly during dry periods. However it is frequently neglected if I am away and has never shown any signs of stress. Fronds are not damaged by frost.

A. flaccidum (Fig.5,5a)

This fern is a common epiphyte in Australia and New Zealand and closely related to the previous species. I have grown it in a sink since being planted as a sporeling about 8 years ago and although very slow it is now starting to produce typical drooping fronds. Wild plants can have fronds up to metre in length whereas my plant has fronds currently no longer than 20cms. However each year the new fronds are slightly longer than the previous ones so I hope one day to see fronds reaching the ground. As with the previous species the fronds have never been damaged by frost or heat.

Fig.5,5a *Asplenium flaccidum*. Left on 26.8.08, right on 1.2.09

A. obtusatum (Fig.6, 6a)

Possibly my favourite fern in my garden. Visitors are always surprised as in some ways it the antithesis of a typical fern. In fact the texture of the fronds is reminiscent of plastic fronds found in florists. The shiny pinnate fronds are adapted to life on the coastline being thick, fleshy and waxy. It occupies similar habitats in Australasia to those of its northern congener, *Asplenium marinum*. However it is much easier plant to keep and grow and does not seem to attract the slugs and snails that can decimate *A. marinum*. Surprisingly I find the closely related *A. oblongifolium* is much more attractive to molluscs and more difficult to keep in good condition. My plant was kindly given to me as a small sporeling by Peter Richardson about 12 years ago. It now nearly fills a butler sink and has fronds up to 35cm long. The crown slowly expands and each year I have to remove other ferns from the sink. This year it will have the sink to itself. The fronds are not affected by drought but can be

Fig.6.,**6a** *Asplenium obtusatum*. Left on 26.8.08, right on 1.2.09

burnt by hard frosts. Each spring I remove old and damaged fronds and these are replaced by scores of new ones emerging throughout the year until the onset of the first frosts of the following winter.

Blechnum

Several *Blechnum* species are very reliable performers, even those species that occur naturally in damp, shady habitats. The leathery fronds of several species are an important feature of a fernery during the winter. I have included a few of the most outstanding species.

B. australe

This South African species is very reliable. It has evergreen dimorphic fronds. These have a rather thin but tough texture. The rhizomes creep slowly and eventually form a clump of refreshing mid-green fronds that are unaffected by heat and drought. Fronds are hardly damaged by frost but in the spring are best removed as the new ones emerge.

B. fluviatile

This New Zealand fern needs a bit more care during the summer but is so outstanding that I decided to include it. Despite its natural habitat being damp, shady streambanks it is surprisingly tolerant of dryness. However a can of water twice a week during the hottest spells is rewarded by perfect fresh, apple green fronds. The simply pinnate sterile fronds spread horizontally over the soil. As the fronds unfurl long scales spread at right angles from the rachis producing a stunning effect that is only found in this fern. Sterile laminae are 30 -40 cms in length but as the rounded pinnae are only 2- 3cms long the fronds are very narrow. The crown of long, narrow fronds resembles a hairy, green multi-armed starfish. The fertile fronds are held vertically from the centre of the crown. The rhizome is stout and erect but stolons produce a few new crowns each season so eventually a colony is formed. The fronds are usually lost during the winter and occasionally older crowns may die off but these are quickly replaced with new ones.

B. hastatum

This South American fern resembles *B. australe* in some ways but is faster growing and more robust. The pinnate fronds are dimorphic and dark green. The creeping rhizomes soon form a large patch. I have obtained this fern on several occasions, usually wrongly or not named. Some clones seem to be hardier than others and persist. The hardy clones I grow are all very drought tolerant and undamaged by frosts. The more tender forms seem to gradually decline and disappear.

B. novae-zelandiae

This is a very variable fern that can be very robust. It is usually sold as *B. capense* although that is a South African species that was wrongly thought to be widespread in Australasia. All these Australian and New Zealand '*B. capense*' are now classified as several separate species. *B. novae-zelandiae* can get very large with fronds up to 2.5 long in its native habitat. However I have only seen much smaller in Britain and with me fronds of 60cm are exceptional. Even so it is a very handsome fern and if grown in full sunlight the new fronds are a bright pinkish-orange. The fronds tend to be slightly damaged by frosts and are best removed in the spring. They are quickly replaced by colourful new ones.. New fronds are produced throughout the growing season.

B. nudum (Fig.7)

Fig.7 *Blechnum nudum*. 26.8.08

This robust fern from Australia is another that prefers shade and shelter but I find is remarkably drought tolerant. With me it forms a large clump although the fronds are shorter than those that occur on plants grown in more favourable localities. Even so, fronds reach up to 80cm in length and an old plant can produce a large number of fronds each growing season. Although the new growth is green, the size and habit of the fern ensures it stands out in the fern border.

B. procerum

This fern is another native of New Zealand. It is less exuberant than some other blechnums but forms a slowly expanding, low growing colony of bronzy-green spreading fronds that forms a good ground cover. I have no other fern with this

colouration and I find that it is a very attractive fern for the front of the border. Only about 4-8 pairs of relatively short and broad pinnae are present on the sterile fronds giving a rather neat appearance. Fertile fronds are held erect. It is not affected by drought or frost.

B. wattsii

This a very handsome Australian species with reddish-bronze new growth. It spreads more rapidly than the others species described. However it is much less aggressive in the garden than *B. chilense*. In some ways it resembles a smaller version of that species but is much more refined. The unfurling fronds are very attractive and the broad, matt green adult foliage is particularly striking. It is unaffected by heat and is surprisingly resistant to frost.

Cheilanthes

I have tried several *Cheilanthes* and a few have proved attractive and persistant. These are ferns that grow naturally in dry environments and the main threat is cold, damp conditions during the winter. I grow them in sinks on a south-facing patio where they get plenty of sunshine and although not covered or protected they get some heat radiation from the house walls in winter. Acute drainage is essential and I use a very gravelly compost. The ferns are placed on top of the compost and 5-7 cms of grit is placed around the root ball to help ensure water drains away quickly.

C. eckloniana (Fig.8, 8a)

This South African species is particularly handsome. It has a shortly creeping rhizome and the fronds are held in an erect posture and reach about 35cms in length. The lamina is moderately grey hairy on the upper surface becoming less so with age. The under surface is densely felted with tan scales, the two surfaces contrasting nicely. The scales and hairs on the young fronds are whitish and contrast with the older foliage. The fronds are undamaged by frost, rain and wind and my plant seems to be in perfect condition throughout the year. I cannot really fault this plant and I am sure it would thrive on a well drained sunny rockery.

Fig.8,8a *Cheilanthes eckloniana*. Left on 26.8.08, right on 1.2.09

C. tomentosa

This is the most commonly seen *Cheilanthes* and is often available in garden centres. It is easily grown in various situations in the garden and only requires bright light and a well drained soil. The leaves are densely coated with whitish hairs and scales. It forms a tuft of fronds up to 30cms long.

C. wootonii (Fig.9, 9a)

This is another very attractive species. It is smaller than the previous two species with fronds only about 15cms long. However the rhizome creeps quite quickly and a dense patch of fronds is soon formed. The lamina is finely divided into bead shape pinnules that are nearly glabrous on both surfaces. However the fronds appear densely hairy and this effect is caused by long, fine pale scales on the rachises and costae that cover the lower surface of the frond. These poke through the gaps between the pinnules so that the upper surface appears hairy too. This is another species that seems impervious to wind and rain through the winter.

Cyrtomium macrophyllum

Several species of *Cyrtomium* are excellent and easy garden ferns. I have highlighted this species as it can form an exceptionally striking specimen. I grew mine from BPS spores about twenty years ago and since then it has always performed well. The rhizomes splits and forms several crowns over the years but I prefer not to divide them as fronds are produced quite sparsely. The pinnate fronds reach about 70cms and usually possess

Fig.9,9a *Cheilathes wootonii.* Left on 26.8.08, right on 1.2.09

4-5 pairs of large ovate pinnae up to 15cms long. The terminal pinna is often 3-lobed. The fronds are leathery and pale green and produce abundant circular sori on the undersides. The whole effect contrasts completely with most other ferns in the garden. The fronds are hardy to heat and frosts but emerging fronds flush quite early and can be caught by late frosts. However new fronds are produced throughout the summer and the fern soon recovers.

Dicksonia fibrosa (Fig.10, 10a)

Of all the tree ferns I have experimented with this has been the most successful. I planted it as a small sporeling and it survived several cold winters early in its life. Establishing much more rapidly than a trunked specimen it soon adapted to life in Essex and quickly developed a large but stemless crown. It never appeared to suffer in hot weather and one reason for this became clear when it was lifted and moved to my new garden. The root system was massive and probably extended to the boundaries of the border. By then a 30cm trunk had developed that was hidden from view by surrounding plants. I managed to lift as big a rootball as was practical and it has settled down well in my new garden. Judging from my experience if a tree fern can be established as a young plant it will adapt much more readily to the local conditions than an older, trunked specimen. It will grow quickly and survive with minimal additional irrigation. This species, originating from New Zealand, has shorter, harsher fronds than the more common *D. antarctica*. The fronds of my plant have never been lost over the winter period even when frozen for days on end.

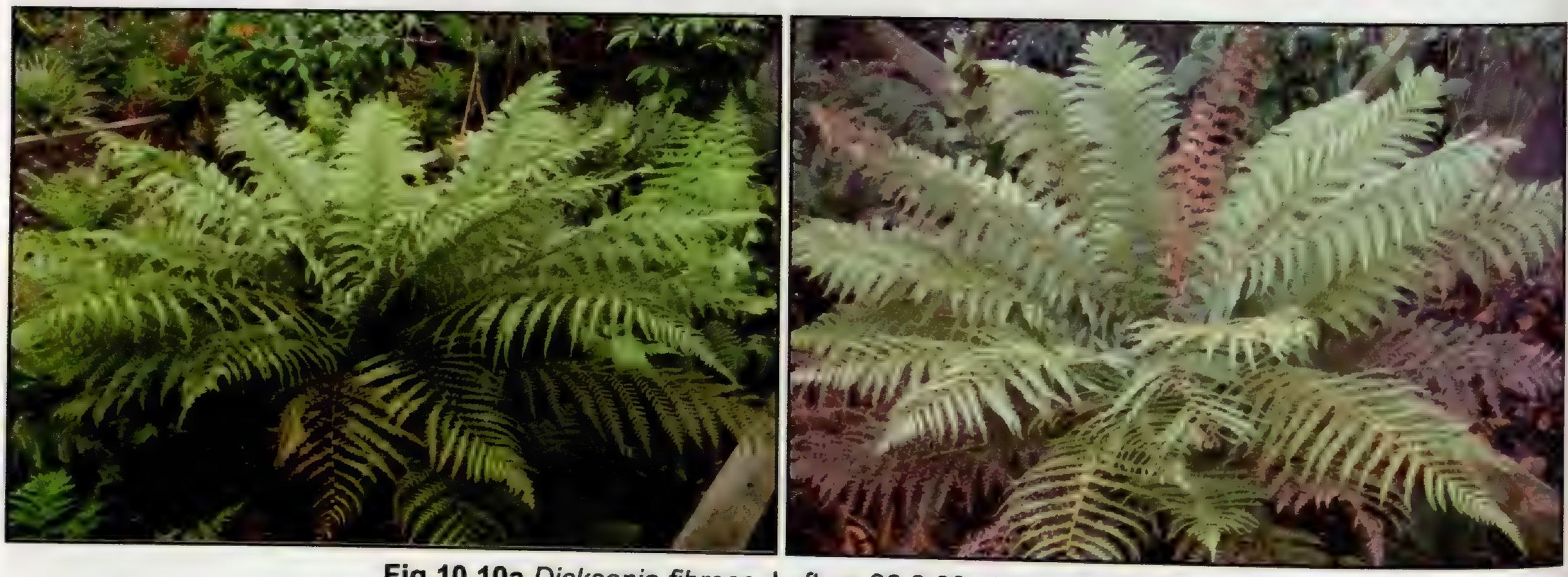

Fig.10,10a *Dicksonia fibrosa*. Left on 26.8.08, right on 1.2.09.

Doodia australis

I am particularly interested in *Doodia* but only one has proved to be both hardy and attractive. *D. australis* is the most commonly available species despite what books and labels may say. The fronds are tough, leathery and rough, the roughness caused by persistent scale bases. Although the fronds are quickly destroyed by frosts new growth rapidly appears in the spring. In the best forms the unfurling fronds are bright red and gradually mature to a dark glossy green. The fronds are around 30cms long and are very heat tolerant. This species performs well in sun or shade. This is one of the few exotic ferns that produces self set sporelings in my garden.

Microsorum fortunei (Fig.11,11a)

This species is surprisingly tough and gives an exotic look to a small corner of the garden. The narrow lanceolate, shiny and rather fleshy fronds are of shape commonly found in sub-tropical polypods. It is native to a wide area of Eastern Asia. It is occasionally found in collections wrongly named as *M. pappei*, a South African species, and they probably all originate from the same source as it is easy to divide and pass on. I was surprised at how tough this fern is, although hard frosts can scorch the fronds. Heat and drought do not cause any problems. It has a slowly creeping rhizomes and after some time forms a dense patch of shiny upright fronds.

Fig.11,11a *Microsorium fortunei*. Left on 26.08, right on 1.2.09 in Barrie Stevenson`s much colder central Suffolk garden.

Paesia scaberula

This was one of the first ferns I grew from spores. A New Zealand endemic, I had seen an illustration of a frond (in *European Garden Flora* Vol.1) and was captivated by its finely divided form. The sporelings rapidly matured and I was not disappointed. Although appearing delicate the fronds are harshly textured and covered with reddish hairs and sticky glands. The fronds are a yellowish-green, 3-4 pinnate and can withstand full sun and heat easily. A bonus is the unusual but pleasant aroma, a resinous lemon to my senses, that wafts around the garden on hot days. The creeping rhizomes can spread rapidly in a light soil but are easily controlled. If the roots get too dry the fronds wilt but recover quickly with a can of water. It is best in an acid, organic compost and I found it grows well in pure composted bark. Unfortunately, like the related Bracken, the rhizomes are nearly impossible to transplant unless a large chunk of rhizomes and compost are lifted together. However it is so quick from (fresh) spores that this should not be a problem. The fronds are fairly resistant to frost but become untidy over the winter and are best removed completely in the spring.

Pellaea

Pellaea is related to *Cheilanthes* and require similar conditions although the three species I have included grow well in shaded sites with me.

P. andromedifolia (Fig.12)

This species is one my favourite ferns. It originates mainly from California extending northwards and southwards to Oregon and Mexico respectively. The triangular tripinnate fronds are quite large, reaching 60cms in length, half of which is stipe. They are quite stiff in texture but not as fragile as some related species. The ultimate segments are small, rounded and widely spaced giving an airy, graceful effect. The pinnulules are about 10mm long, thinly coriaceous and slightly glaucous. They contrast nicely with the pinkish rachises. The rhizome creeps slowly and each year the number of fronds increase and forms a mass of tiny leaflets

Fig.12 *Pellaea andromedifolia*. 26.8.08

held above lower growing ferns. Despite being described as rather tender and difficult to cultivate I have found it to be very reliable. The fronds have not been touched by frosts, heat or drought. I grow it in a sink protected against a north wall.

P. cordifolia

This Mexican fern resembles several other *Pellaea* species but is distinguished by the pale stipe, straight rachis and ovate pinnules. The rhizome is shortly creeping and forms a compact crown. The pinnules are sparsely arranged on the frond and are a pale green. I have grown this fern for many years and it has always performed well although the fronds are rather fragile and by spring it is worth removing any remaining ones and allowing fresh fronds to grow unimpeded

Fig.13 *Pellaea falcata*. 26.8.08.

P. falcata (Fig. 13)

This species is quite widely spread in Australasia and South East Asia and is surprisingly hardy. The dark green, glossy pinnate fronds reach about 40cms and withstand most frosts. They survive heat and sun well. The rhizome creeps slowly and can eventually form a large patch. This fern is mainly grown as a house plant but looses its pinnae quickly if too dry. In the garden the roots dry out less quickly and the plant retains its pinnae ensuring a lush and healthy appearance.

Polypodium

Many *Polypodium* species perform well in dry gardens but are often untidy or leafless during the summer. The two I have included tend to look good for the majority of the year and have proved to be very hardy.

P. glycyrrhiza

This species is native to the coastal areas of North America extending beyond Alaska into eastern Siberia. The pinnatifid fronds are a medium matt green, rather thinly textured compared to many *Polypodium* species and are supposedly summer dormant. However I find that new fronds emerge just as the old fronds turn yellow and drop in August. For a few days in late summer the fronds are rather sparse but they quickly fill out and cover the bare rhizomes. This a very easy and reliable fern that I obtained from Martin Rickard many years ago. As many *Polypodium* species are very similar in appearance it is of interest that the identity of this plant was confirmed when I donated some material for DNA analysis as part of a research project

P. scouleri

This fern resulted from one of my earliest attempts at growing ferns from spores. Although growth is quite slow, over the years it grew to cover a substantial area of old log in my previous garden. The leaves are extremely thick and leathery and have withstood some very cold spells and some challenging warm summers without flinching perhaps, due to being grown in a shaded area. The pinnatifid fronds are a dark glossy green and the pinnae are bluntly rounded. There does not appear to be a dormant period and the fronds drop individually as they age. The sori are large and bright yellow maturing to orange.

Polystichum

Along with *Blechnum*, *Polystichum* provide much interest over winter. I highlight here a few that I find particularly attractive.

P. dracomontanum

One of the few South African ferns that I grow but there must be many more that would thrive in our gardens. This species bears an overall resemblance to many other *Polystichum*, glossy bipinnate fronds, pinnules with aristate teeth and unfurling crosiers with a dense covering of scales. However unlike most other hardy species the rhizome is branched and creeps, slowly building a mass of fronds rather than the more usual 'shuttlecock'. In the wild it is restricted to the Drakensberg range where it prefers an open aspect in its natural habitat. In the garden I have found that it grows well in full sun but prefers dappled shade. The young crosiers are covered with pale scales and appear throughout the year. It is undamaged by frosts.

P. proliferum

This Australian species can grow into a large specimen and eventually forms a small trunk. It is particularly robust and handsome with a massive spreading crown resembling a young tree fern. The dark green bipinnate fronds which can reach up to 1m long are thick and leathery. The unfurling crosiers are densely covered with large dark-centred tan scales. Each frond produces one or two buds towards the apex that will develop into new ferns. I find that the older fronds collapse onto the ground and these fernlings root naturally quickly forming

a new plant. The fronds are frost and heat hardy and look good all year round. The new fronds erupt in as a mass of colourful scaly, hairy pale green croziers that contrast beautifully with the older dark green fronds.

P. vestitum

This New Zealand endemic can produce large fronds to 1m in areas of high humidity. In the dry Essex atmosphere the fronds are barely half that length. Even so it is very handsome and attractive fern. Despite being related to the previous species they are easily separated. *P. vestitum* has much more glossy fronds, the pinnule teeth are more sharply pointed and the scales are darker and more abundant. The dark green, shiny fronds are very attractive all year round. Despite the lack of humidity the fronds apart from their small size are not affected by heat. They can be damaged by very hard frosts but re-growth is quick in the spring.

P. wawranum

Another New Zealand endemic, this is one of the newly segregated species formerly included within *P. richardsii*. It is a very attractive fern, with dark green bipinnate fronds held rather erectly. The pinnae mid-ribs are darker than the surrounding lamina tissue and the indusia have small dark centres. The unfurling crosiers are covered in pale scales that contrast with the older fronds. The fronds are up to 40cm long and are not damaged by heat or frost.

Pteris

There are many species of *Pteris*. It would appear that many are worth experimenting with if obtainable.

P. cretica

Although a common houseplant the form of *P.cretica* I grow is also a very good garden plant. I grow it in nearly full sunshine where it remains fresh and green throughout the summer. Fronds get tatty through the winter and I remove them in the spring. This fern is very underrated and is well worth growing in the garden.

P. umbrosa (Fig.14, 14a)

This fern is more attractive and refined plant than the previous species. It originates from Australian forests and I grow it in a shady position. It seems very hardy, is heat tolerant and has not been damaged by frosts. It is a more robust and vigorous plant than *P. cretica* and has more pinnae to each frond giving a very lush effect. The rather shiny fronds reach 60cms and the rhizome creeps slowly eventually forming a large clump.

Fig.14, 14a *Pteris umbrosa.* Left on 26.8.08, right on 1.2.09.

Pyrrosia

These ferns are adapted to life as epiphytes and lithophytes where conditions can be very harsh. Often they survive in full sunshine with intermittent rainfall. The fronds are covered with small star shaped scales that give these ferns a unique appearance. Unfortunately only a few species are likely to survive in British gardens and most of these are difficult to obtain.

P. eleagnifolia

This species is endemic to New Zealand. It seems to be quite variable and I have lost some forms over winter periods. The form I currently grow seems to be fairly tough and has survived several winters. The small obovate fronds are about 5 - 7cms long and covered in starry scales. These gradually erode from the upper surface of the leaf but persist below. The slender rhizomes wander quite widely before sending out new fronds and will eventually form an extensive colony. I grow it in a raised sink due to its small size and it will eventually fill this. It makes a very attractive furry leaved mat that is very unfern-like.

P. lingua

This is like a much larger version of the previous species. It is also much hardier and has survived -10°C in the past although it may lose its fronds. It is found naturally over a large part of Eastern Asia. Once it is established

it is fast growing and I was constantly giving clumps and pieces of rhizome to fellow enthusiasts. However it is slow and difficult to get re-established and the many people have had problems getting it re-grow. When I moved house recently I took a large clump that has only recently started to grow and spread. The fronds are about 30cms long, half of which is stipe. The upper surface quickly loses its covering of scales and becomes slightly glossy. The underside remains densely covered with whitish scales that eventually become buff. Fertile fronds are quite frequent and resemble the sterile the fronds in shape. The undersurface is densely covered with tan-coloured circular sori. Again this is a most unfern-like fern that makes an excellent ground cover.

Todea barbara (Fig.15, 15a)

Fig.15,15a *Todea barbara*. Left on 26.8.08, right on 1.2.09

Todea barbara is a southern hemisphere relative of *Osmunda* and is restricted to Australasia and South Africa. I had always considered it to be tender but I fortuitously obtained a decent sized plant from Peter Richardson when he moved abroad. I decided to risk planting it in the garden and there it has thrived for nearly 10 years. Although it has not reached the dimensions of plants grown under cover, the fronds attain 60cms in length in my garden. The bipinnate fronds are leathery and rather glossy. They can be damaged in cold weather but new fronds are produced throughout the growing season and form a dense mass by the autumn. They are not affected by heat. Sporangia develop on the underside of the fertile fronds each year. The rhizome is erect and woody but it will be decades before it starts to form a trunk such as those seen in indoor collections. ❐

Maraudering caterpillars.

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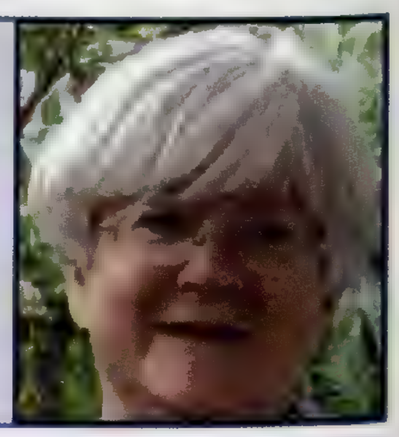

Is our holly fern at risk from marauding caterpillars?

Whilst ferning on Glasnock limestone with the BPS Scottish group we came across this caterpillar which was feeding on rare holly fern (*Polystichum lonchitis*). It had munched its way through several pinnules and judging by the amount of pooh present, it had been there for sometime! The caterpillar has been identified as that of the broom moth *Ceramica bicolorata*. It is a very common species and feeds on a wide range of common plants including broom, dock, plantain, birch and even bracken! So hopefully we think this might be just a one off! ❐

New fern introductions from Fibrex Nurseries

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Ferns have been a large part of our working lives for more than 30 years. We would therefore hope that we have got to grips with growing them. We know when and how to collect spore and get good results from spore sowings. We are not afraid to divide rare ferns, in fact it`s one of our favourite jobs. Producing good quality plants for resale is no problem and we can usually persuade people to buy them. What does frustrate us is the difficulty to produce new fern cultivars.

At our family nursery, colleagues and I grow Pelargonium and Hedera alongside ferns. Rarely a year goes by when there are no new varieties either of our own or someone elses to add to our lists, but in thirty years we have only managed two new distinct cultivars of ferns, plus four that could be called re-introductions and one new one from someone else

When growing a lot of ferns from spore there is often some slight variation from the parent, but most are not of commercial interest. It is important to be discriminating, since the general gardening public is unlikely to notice slight differences that you might think are 'as plain as the nose on your face'. So when we spotted our two very promising babies growing in the middle of their respective batches we had no doubt they were something really different.

Fig.1 *Athyrium filix-femina* 'Fibrex'

Fig. 2 *Polystichum aculeatum* 'Portia'

The first fern was found in a sowing of *Athyrium filix-femina* 'Fieldii' about 15 years ago. Athyriums are notorious for giving very variable progeny when grown from spore, so it`s usually a good idea to grow on a batch to see what you have got and then weed out the rubbish. The new fern stuck out like a sore thumb, definitely a form of 'Fieldii' but much better, Cinderella next to her ugly sisters. We named the fern *Athyrium filix-femina* 'Fibrex'. (Fig.1) It has the narrow fronds of 'Fieldii', about 4 cm wide and 60cm long, cruciate, but instead of the pinnae being fine they are broad and set closely together giving a plumose effect. Unlike other lady ferns 'Fibrex' fronds are not flimsy, do not suffer with weather damage in summer and look good until the first frosts. Like many of the very gorgeous ferns this one is sterile too, but it is vigorous and readily produces crowns and can be divided every couple of years. This is a really good fern to grow in a pot. It has received an Award of Merit from the RHS.

Our second baby came forth from a batch of spore grown *Onoclea sensibilis* these as a rule come true to type but this time there was one oddity. The new fern looked very much

Fig. 3 *Polystichum setiferum* 'Hamlet'

Fig 4 *Polystichum setiferum* 'Helena'

like an ordinary onoclea except it only grew to about 30cm tall. It is a very chunky plant producing a lot of wavy fronds which are almost imbricate. In ten years this pretty neat little fern has not produced any beads so we can only assume it is sterile, but it divides easily as long as it is allowed to grow for a couple of seasons. This fern does well in a pot, we named it *Onoclea sensibilis* 'Fibrex Frilly'.

Some years ago we bought a fern collection from Mr and Mrs J Lord of Austwick, Yorkshire. They were retiring and moving from the family home. Part of the collection went with the Lords to their new home and the rest came to us. A few years later when Mr Lord died his family offered the rest of the collection for sale so we bought that too, keeping the entire collection together. This collection had been put together by Tom Bolton, a sweet pea grower and fern enthusiast from Yorkshire over 100 years ago. It was passed down through the family, finally ending up with us. There are some lovely ferns in the collection; athyriums, aspleniums, dryopteris, polypodiums, osmunda and polystichums. Unfortunately none of the plants were labelled, but we have had a good time sorting them out and managed to name most .....until it came to *Polystichum setiferum*!

Initially we thought most of them were *Polystichum setiferum* 'Divisilobum' but after growing them in the garden for a couple of seasons we could see there were differences. They would all have been named at one time. Out came all the reference books and my brother Richard and I had a go matching descriptions to plants. In the end after nearly driving ourselves mad we sorted out the ones that were different and could be propagated by spore or bulbils. The rest we have left and grow them as a mixed spore or bulbil raised batch of divisilobums. There are still one or two that are sterile and do not make new crowns.

We have given new names to four of the selections from this collection:

Polystichum aculeatum 'Portia',(Fig.2) we have been told this is not an aculeatum but we are sticking with it for now as it looks very like one to us. 'Portia' is small, 20-30cm tall, dark green and very much like Polystichum aculeatum but the pinnae are more rounded. The fronds are upright and non arching making a neat shuttlecock-shaped plant. This is a good evergreen fern, but we do not advise growing it in a pot for longer than two seasons as it tends to fade away. It does not produce bulbils but comes reasonably well from spore.

Polystichum setiferum 'Hamlet',(Fig.3) is a very good form of plumoso-divisilobum, the fronds are broad based, 30cm or more wide narrowing to a point and 60-90cm long, medium green and the plant has an open habit. The bold fronds are heavy and pull towards the ground. This is a good evergreen fern

and does well in a good sized container if the compost is renewed regularly. Propagation is from bulbils which take a few years to produce plants in true character.

Polystichum setiferum 'Helena',(Fig.4) looks quite delicate, the fronds are dark green, 30-60cm long, fairly narrow at the base (15cm) gently narrowing to a point. The pinnae are well spaced on the frond and the pinnules fine and deeply cut giving an almost spikey appearance. This fern has an upright habit and is evergreen, it does well in a pot although it will not reach its full height. Propagation is from bulbils and it looks in character even when young.

Polystichum setiferum 'Othello',(Fig.5) this is a form of divisilobum. The fronds are medium green and narrow, 15 cm wide at the base, gently narrowing to a point and 60-90cm long. The pinnae are neatly spaced closely together and the pinnules are hardly cut. What makes this fern stand out is the way the long narrow fronds lay across the ground. This is another good evergreen fern but does not do well in a pot. Propagation is from bulbils.

Our last new introduction is *Asplenium scolopendrium* 'Zeal Dwarf',(Fig.6) this was given to us by Keith Frampton from Northampton who was given it by an elderly friend in Devon, the fern is named in his friend`s honour. This gorgeous little fern is a type of crispum. The fronds are narrow and only 15cm long and very wavy along the edges they also twist a little and slightly divide at the tip. The fern looks like a small green billowy cloud. As with other aspleniums this one is hopeless in a pot after two seasons. It likes limey soil and good shade. Propagation by spore can be tricky, and better from frond ends when the plant is old enough.

We try to propagate these ferns as much as possible, but please be aware that there is usually a waiting list. ❐

Fig. 5 *Polystichum setiferum* 'Othello'

Fig. 6 *Asplenium scolopendrium* 'Zeal Dwarf'

Ferns which live with ants!

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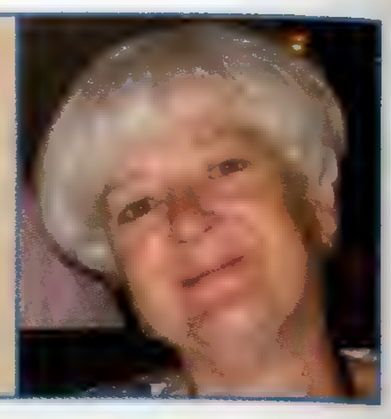


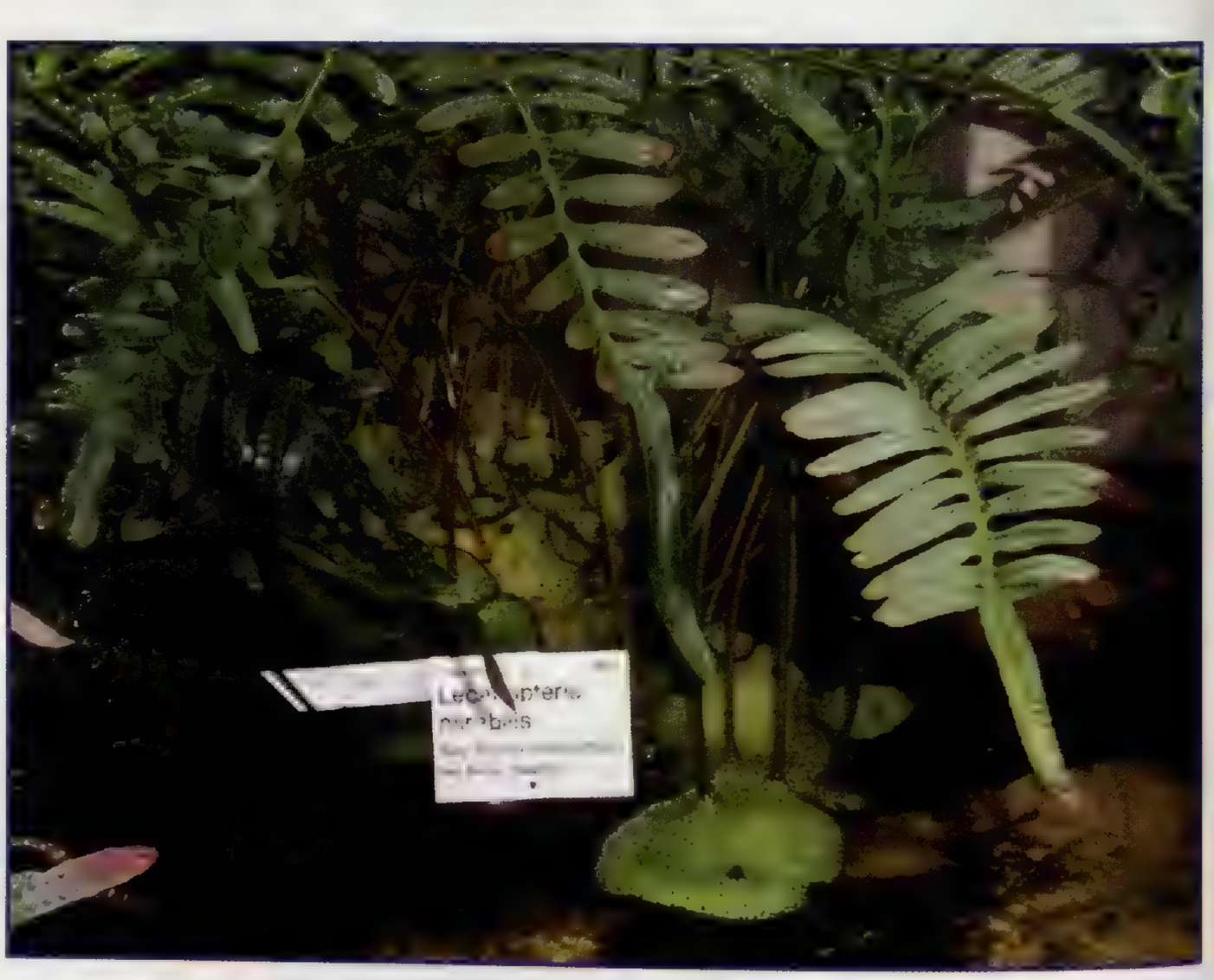
I am always keen on any opportunity to combine two of my main passions, insects and ferns. So when I came across the ant fern, *Lecanopteris carnosa* growing in the greenhouse at Cragside in Northumberland I was intrigued and wanted to find out more.

Although flowering plants commonly form associations with insects and other animals for pollination and seed dispersal, it is rare for ferns to do so. In fact there are three main fern genera which associate with ants: Pteridium, bracken; Solanopteris, the potato ferns and Lecanopteris, the ant ferns.

Bracken, which occurs on all continents except Antartica (give it time!) produces active nectaries adjacent to the lowermost pinnae of young fronds and these seem to attract ants. There is a good description and pictures in Page (1982). The ants may be encouraged to make their nests around the bracken colony thus deterring herbivorous animals like slugs and snails which might otherwise flourish beneath the bracken canopy. The ants are probably also a deterrent for larger grazing animals which might browse on the young tender croziers which have not yet accumulated the array of toxic chemicals produced in the fully expanded bracken frond.

Solanopteris is a new world genus of which there are four described species occurring in tropical America whereas Lecanopteris is an old world genus consisting of thirteen described species occurring throughout the southeastern Malaysian archipelago. Though both these genera belong to the Polypodiaceae and are epiphytic, they are not particularly closely related and their association or mutualism with ants has evolved quite separately, in different parts of the world, involving different parts of the plant.

Lecanopteris deparioides



Lecanopteris mirabilis

Epiphytic ferns which live on trees near the top of the forest canopy are particularly challenged. Although the forests are wet and moist, near the top they are subjected to drying winds and ferocious heat from the sun, so getting enough water and nutrients can be problematic. The other challenge is to avoid being eaten by the millions of herbivorous animals which also live in the canopy.

The potato ferns of tropical America have solved both these problems by evolving modified stems along short lateral branches which look like potatoes. Each tuber has an entrance hole which faces downwards through which ants enter and make their home, laying their eggs and rearing their young. This is in common with many other social insects such as wasps and bees which usually make their nests with downward-pointing entrances. Presumably this is to ensure that the nests do not fill with water and drown the eggs and larvae. Roots are produced around the rim of the tuber entrance and grow into

the structure. These get flattened against the inside of the tuber wall (probably helped by ant activity) and produce dense brown hairs. During this process the plant gets protection from the ants and the ants get some nourishment and moisture from chewing the fleshy roots. Slowly the inside of the tuber enlarges forming chambers for more ants to take up residence. Eventually the tubers get filled with organic matter; dead larvae and frass (insect pooh!). At this point the ants abandon the tuber and move into fleshy new ones. The humus which has accumulated in the tuber absorbs any available water like a sponge and this provides a valuable source of water and extra nutrients, notably nitrogen, to enhance the plant's epiphytic life style. Read the chapter in Moran (2004) for more details and about his encounter with ants

Lecanopteris sinuosa
Photo Albert Huntington

The ant ferns of SE Asia produce fleshy rhizomes which grow closely together and form a solid covering on areas of host tree bark. The roots of the plant are underneath this rhizome mass which presumably aids in some conservation of moisture. The rhizome grows continuously at one end and dies back at the other. As it ages the central pith cells lose water and shrink forming hollow cavities which are first explored by ants for water and nutrients, then later, as the rhizome turns black, they take up residence, lay their eggs and rear their young. The plant will gain some protection from plant-eating animals which will avoid the painful bites and nasty formic acid spray produced by the ants when the plant is disturbed. A similar process occurs; the rhizome eventually becomes filled with organic matter which presumably provides the plant with extra nutrients, while the ants move into fresher rhizome. As far as I know the Lecanopteris rhizomes are pretty persistent and do not take on the spongy nature of the Solanopteris tubers. In addition to providing a home for ants in return for protection, the ants also exploit the orange sori of the fern which they harvest at night. This was first observed by R.E. Holtum in 1954. The sporangia contain oil bodies which provide an important supplementary food source (carotenoids) for the ants which they cannot easily manufacture for themselves.

Janzen (1975) also gives a fascinating account of many other plants which associate with ants. Many epiphytic flowering plants from very different families have evolved adapted parts of their morphology to accommodate them. These include Acacias from the bean family; Hoya and Dischidia from the milkweed family; certain bromeliads and nepenthes; the tribe Hydnophytinae from the madder family and of course orchids. These together with the ant ferns provide a most interesting and complex example of convergent evolution. ❐

Read more about ferns which associate with ants in the following:

Janzen, D.H. (1974) Epiphytic Myrmecophytes in Sarawak: Mutualism Through the Feeding of Plants by Ants. *Biotropica* 6, (4), pp. 237-259.

Jermy, A.C. & Walker, T.G. (1975) Lecanopteris spinosa; a new ant fern from Indonesia. *The Fern Gazette* 11(2/3), pp. 165-176

Holtum, R.E. (1954) *Flora of Malaya Vol II. Ferns of Malaya*. Government Printing Office: Singapore.

Moran, R.C. (2004) *A Natural History of Ferns*. Timber Press.

Page, C.N. (1982) Field observations on the nectaries of bracken. *The Fern Gazette* 12 (4), pp 233-240.

The British Fern Gazette 1909 – 2009

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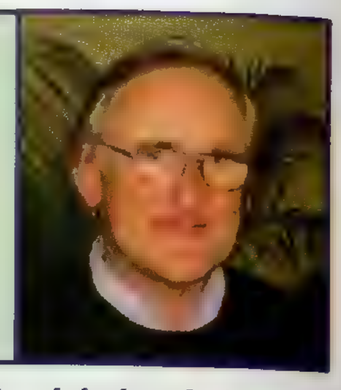

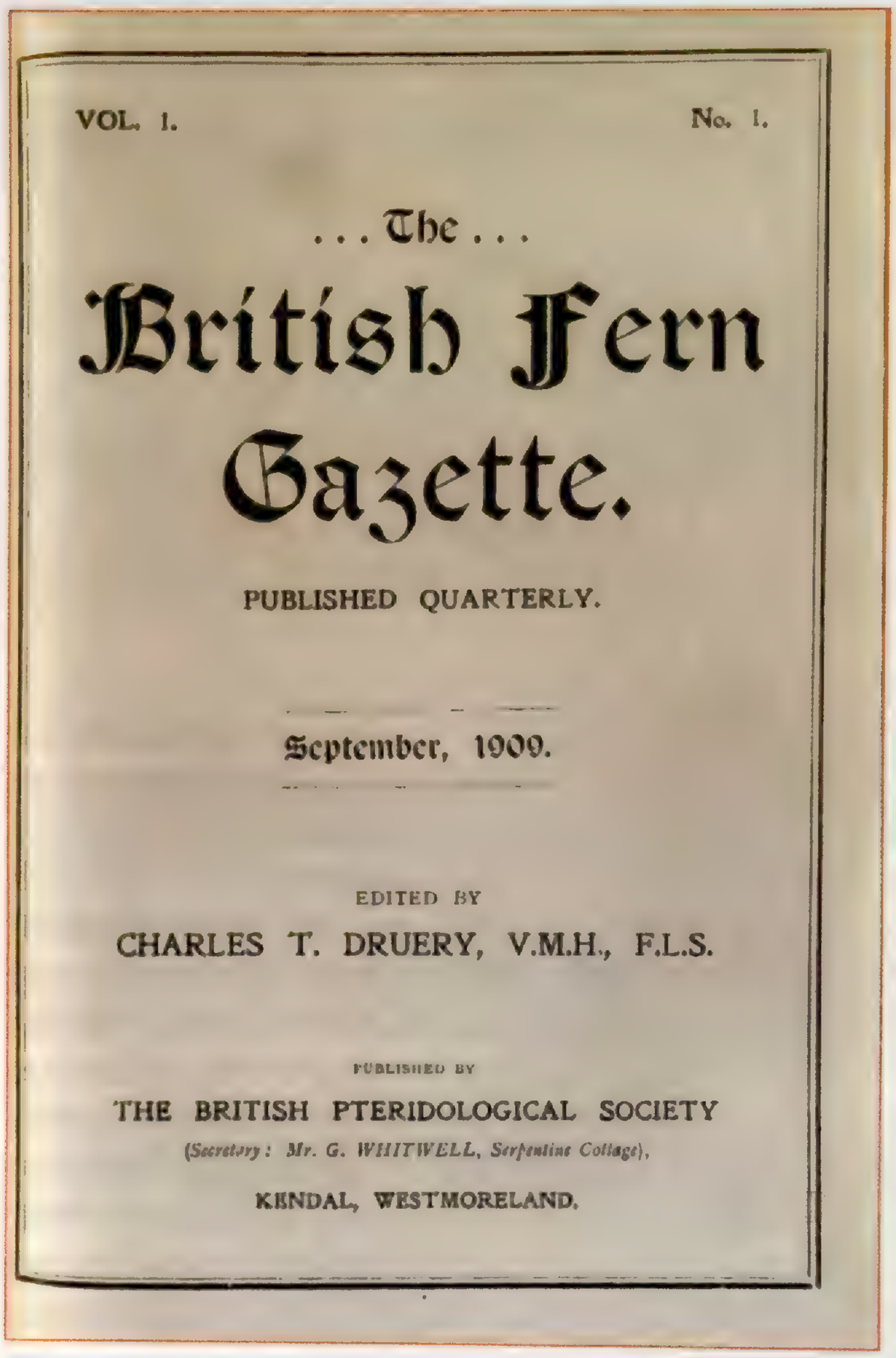

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THE BRITISH PTERIDOLOGICAL SOCIETY

(*Secretary: Mr. G. WHITWELL, Serpentine Cottage*),

KENDAL, WESTMORELAND.

This is a year for anniversaries. The *Pteridologist*, our Society`s junior journal, celebrates 25 years since its birth (see information elsewhere in this issue by Alec Greening). While our senior journal *The British Fern Gazette* this year celebrates its centenary.

In 1909 *The British Fern Gazette* was really a forerunner of today`s *Pteridologist* – without the colour photographs! It was a mine of information for the fern grower – principally the fern cultivar grower (cultivar is a modern word to distinguish between botanical varieties and cultivated varieties – hence cultivar). It stayed that way for 50 years until 1959 when a new editor, Clive Jermy, took over. He realised that if our society were to grow we needed to appeal to the scientific world. This was at the beginning of Volume 9 which he subtitled 'New series'. It certainly was new, immediately the emphasis changed towards scientific research and Society membership started to grow healthily. Horticultural authors were encouraged to submit articles but few did, although Jimmy Dyce and Reginald Kaye were notable exceptions. By 1963 Jimmy Dyce had decided the Society had to address the needs of non-scientific members. Accordingly he launched the *Newsletter*. This grew in size until in 1973 it underwent a change of style and reappeared as the *Bulletin* containing Society news and articles of general interest. This also then grew along with membership. In 1984 as a result the article component was issued as a new journal, the *Pteridologist*, and the Society news continued to be published as the *Bulletin*.

Back in 1909 *The British Fern Gazette* was initially issued four times a year with each part carrying a black and white frontispiece and usually 24 pages of text. Such a relatively large volume of copy was largely due to the energy of one man, Charles Druery. The first issue in September 1909 was entirely written by Druery, he apologises for the fact on the title page! He had nothing to apologise for, everything he wrote was fascinating and informative. Most articles were concerned with cultivation of British ferns, the descriptions of cultivars, results of crossing experiments, fern hunting etc..

Before the launch of *The British Fern Gazette* the Society did publish a string of *Abstracts of Reports and Papers read at Meetings*. These *Abstracts* ran from 1894 until 1905 (Currently available as Special Publication No. 5). As far as I am aware nothing was published between 1905 and 1909. Even earlier, the British Pteridological Society published an *Occasional Paper No.1* in 1875. (This was discussed by Michael Hayward in last year`s *Pteridologist*. An enhanced facsimile of it is currently available from Michael as another BPS Special Publication). Links between this early British Pteridological Society and our Society are very strong but the two are generally not recognised as the same society . Even though the name and all the members were pretty much the same!

From the end of the 1920s until 1950 the number of issues was reduced to 2 a year, with publication ceasing completely from July 1939 until 1948 although a special *Brochure*, not a Gazette, was issued at Christmas 1939. From 1951 the Gazette was usually one a year until 1990 when two a year once again became the norm and it has continued at two a year up to the present day.

In 1974, at the beginning of Volume 11, the name was changed from *The British Fern Gazette* to *Fern Gazette*, to reflect the international nature of its copy. Sadly this confused some readers especially libraries since journals are catalogued alphabetically. In general the name change is, I believe, universally regretted.

Sadly many fern growers dismiss the *Fern Gazette* as irrelevant to them. I am a grower but always opt to have it and find much of interest in every issue. It is exciting to see what exotic ferns look like, it is also very interesting to discover their habitats. Even in the tropics many ferns are high altitude and hardy in Britain. Armed with the *Fern Gazette* you have a better chance of picking wisely from the spore list and growing species new to cultivation in cold climes.

Back issues of *The British Fern Gazette* are rare collectibles but some are usually available from the Society. Most often they would be copies as issued but some of the rarer issues are normally only available as photocopies. ❐

A SIBERIAN SUMMER

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Fig.1 Participants of the first Russian Pteridological Conference on the excursion to the Altai Mountains beside the Katun River, Siberia

Following the lectures of the first Russian Pteridological Conference (see separate report [pages 122-3] in this edition of the *Pteridologist*), delegates set off on a well-organised optional week's excursion by minibus to the Altai Mountains. It was two long days drive to get to the mountains of the Altai Republic, on the border of South Siberia and Mongolia, initially following the main trade route from Russia towards Mongolia and China, and the same back. This left three days to explore the diversity of habitats that this extraordinary mountain range offered. We crossed latitudes equivalent to much of western Europe, but on longitudes equivalent to central to eastern India, and I am left with several clear perspectives.

Steppe, rivers and forests

The drive through the southern Siberian Plain was predominantly across apparently endless, flattish, or only slightly undulating terrain. This is widely forested by taiga vegetation interspersed with patches of grassy steppe. We drove for hour after hour through lowland taiga forest dominated by birch (*Betula pendula*) and pine (*Pinus sylvestris*), with some *Populus* (*P. tremula*) and several *Salix* in wetter spots, mostly with a low canopy of around 12-15m. Across such terrain, even small topographic undulations created a landscape mosaic of wetter and better drained habitats. The whole was broken by some impressive rivers and occasional mountain ridges. The rivers in the plains were usually enormously wide, their courses with large meandering sweeps. In the short Siberian summer and early autumn, these rivers have extensive, well-scoured gravel margins, sandy spits and are sometimes fringed by lake-like cut-offs from former river meander courses. Clearly in spring, these rivers become torrents of freshwater icebergs and glacial meltwater, hence their width and those of the gravel margins. The river Ob was especially impressive in size, although further east, what I have previously seen from the air suggests that the Yenesei, Lena and Amur are as large or even larger.

Fig.2 Altaian landscape, South Siberia.

With increased elevation on the mountain ridges, damper and more diverse forests included Siberian Spruce (*Picea obovata*) and especially the impressively spire-crowned Siberian Silver Fir (*Abies sibirica*). Once the foothills of the Altai-Sayan mountain system in the Altai Republic had been reached, birch and pine with, more scattered, other conifers continued, becoming also mixed with craggy specimens of Siberian Larch (*Larix sibirica*) on steeper topography. Towards the treeline at around 1730m, these gave way to the endemic Siberian Pine (*Pinus sibirica*) and Siberian Juniper (*Juniperus sibiricus*). So even with my conifer 'hat' on, the vegetation was already one which fascinated me, while for the pteridophytes (both ferns and horsetails), many surprises yet awaited.

Vegetation abundance and luxuriance

The vegetation was far from what I expected in two important dimensions. I had always presumed that in the very short summer available for growth in Siberia generally, and especially in the mountains, vegetation

would be somewhat stunted and spartan under these demanding climatic environments. Quite the opposite.

I was amazed by the luxuriance which the Siberian vegetation achieves in the short growing-season available. Its growth is everywhere rapid and vigorous, and by late August and early September most individual plants had become large and surprisingly luxuriant throughout virtually the whole of the range of habitats seen. The sheer verdure of this growth clearly responds to the short but quite sunny and warm summer conditions of these continental interior climates. Even the sparrows seemed nearly twice as large as in the UK, and much the same also applied, at times, to the mosquitos. Among other animals, I saw no bears (although they may, of course, have seen me), only Yaks. Butterflies were surprisingly numerous. A particular pleasure was, in a forest glade, watching several quite large dappled-brown *Limenitis populi* butterflies - close relatives of our Purple Emperor - which I had never seen before, while on a riverbank a stunning surprise was seeing Camberwell Beauties (*Nymphalis antiopa*) - butterflies which, like busses, you wait all your life to see and then two come along at once! Indeed, at moments in Siberia, the pristine condition of the habitats and the sheer verdure of both the plant growth and the associated wildlife seemed more like the tropics, where I had been only a fortnight before, and I had to stop and remind myself where on the globe and in which climate I now actually was!

Fig.3 *Asplenium septentrionale*. Photo. I.Gureyeva

Fig. 4 *Polypodium sibiricum*

Fern diversity

My surprise over the luxuriance of the vegetation was surpassed only by surprise over its second dimension, its diversity. I knew that many genera of plants present in Britain (and especially ones more associated with Scotland) ranged widely across temperate Asia, but what amazed me in the ferns was the diversity of species encountered within individual genera in Siberia. For every one species with which we are familiar in Britain, there were often several species in the Altai. For example, we met multiple species within *Athyrium, Gymnocarpium, Asplenium* (Fig.3 *A.septentrionale*), *Polypodium* (Fig.4 *P.sibiricum*) and *Woodsia* (Fig.5 probably *W.ilvensis*), the latter three often in large clumps on rocks of which *W. calcarea* (see FIG.11 in following note by Irina Gureyeva on page 116) especially impressed me as looking not much like the rest of the genus as I knew it. Further, within *Woodsia* for example, a total of at least ten species are reported from the region, of which we saw several, and the whole of the richness of the ferns, as well as associated flora, left a vivid impression on me that it was like the Scottish flora on steroids !

Fig. 5 *Woodsia* probably *W.ilvensis*

This richness of fern species is probably most directly associated with a different glacial history and a maintenance by subsequent vegetation of direct and continuous postglacial contact with formerly unglaciated areas to the south. Discussion suggests that continuous immigration of species diversity has remained possible, and this southern link seems also especially underlined by the presence here too of unusual fern genera such as the tropical-looking

Fig. 6 *Aleuritopteris argentea* Photo. I.Gureyeva

Fig. 7 *P. pinetorum* subsp. *sibiricum*

polypodiaceous *Lepisorus* (*L. albertii* see Fig.13 In the following note by Irina Gureyeva), aspleniaceous *Camptosorus* (*C. sibiricus* see Fig.14 in the following note by Irina Gureyeva) and the striking cheilanthoid *Aleuritopteris* (*A. argentea* Fig.6). My own view is that this sheer diversity might well have been more like the vegetational diversity we too would have had in the mountains of western Europe, including Britain, before the Pleistocene glaciations came.

Forest ferns and life-cycle turnover

We visited many patches of differing forest types, on valley sides, beside rivers, and throughout the mountainous terrain. All were fascinating. The forest understorey vegetation seemed to be one in which patches of larger forest ferns are frequent to locally dominant. In better-drained forest, pinewood of *Pinus sylvestris* dominated, and in these forests open stands of *Pteridium* (*P. pinetorum* subsp. *sibiricum*) occurred extensively (Fig.7). Indeed, the overall distribution of this pine and this bracken mirror each other (hence the species name). Some of the large and typically widely-scattered, often nearly tripartite. blades of this *Pteridium*, standing at stiffly, slightly assurgent angles, were beginning to adopt their characteristic bright-yellow autumn and rich cinnamon-brown colours by early September. With slight undulations in topography, and differing drainage patterns, the forest understorey changes to slightly damper terrain and the fern communities largely to ones dominated by *Matteuccia* (*M. struthiopteris* Fig.8), with more scattered *Dryopteris* (including *D. carthusiana*), and especially multiple *Athyrium* species. *Polystichum braunii* occurred in sites which linked between the valley floor and rocky sides. We had much debate and discussion especially about the many highly varying *Athyrium* that we encountered.

As an integral part of forest fern life-cycle turnover, we also examined in the field, sites of origin of new prothallial and young fern growth for several of the forest-floor fern species, in which there was much local expertise based on repeated detailed field observations. We saw clear demonstrations of how, for many forest ferns, life first began not on the forest floor itself, but on micro-sites especially those of decaying log stumps and fallen decaying trunk debris. The sporophytes arising at such sites eventually become part of the overall forest floor community as the wood mound continues to decay away. With *Mattuccia struthiopteris*, it was demonstrated that it does not normally propagate itself by spores, only vegetatively through slender underground rhizomes, in addition to its typical more massive upright ones.

Fig. 8 *Matteuccia struthiopteris*

Rock ferns and generic complexes

Almost wherever rocky outcrops arose (Fig 9), many smaller-statured ferns were often present with sometimes considerable local frequency. These rocky outcrops occurred in and around the forests, usually as partly damp and shaded bluffs or as more sunny sites, either wholly beneath the forest canopies or emerging above them. Such bluffs were especially widely present along flanks of the major river valleys, and all those I examined were of highly foliated mica schist rock, which presented numerous exposures of

Fig.9 L to R. Natalia Barabanschikova, Chris Page, Irina Gureyeva, Nina Derzhavina. A rocky outcrop with *Asplenium altajense* and *Polypodium sibiricum.*

Fig.10 Abundant *Eqisetum variegatum* growing through and around typical river margin moss-cushions.

calcareous veins. The ferns encountered included the genera *Asplenium, Woodsia, Gymnocarpium* and *Polypodium*, mostly as multiple species. In sunnier rocky niches the small and attractive fronds of *Aleuritopteris* were present, a fern I had never previously seen, and which had been appropriately graphically used as the emblem of the conference.

The many clumps of ferns on these rocky outcrops varied with both exposure or shade and with altitude, and typically thrived, especially as often cushion-like mounds across the abundant rocky clefts. It also became clear in discussions that not only were multiple species of most fern genera present, in several genera, hybrids had been identified. Multi-species complexes were probably present (eg. around *Asplenium altajense* and *Polypodium sibiricum* and possibly in *Athyrium, Gymnocarpium* and various *Woodsia*), upon which the Russian pteridologists and their students are actively working. I came away with the impressions that even these severely cold winter climates are no impediment to the progress of fern evolution, and fern species diversity can be large and evolutionary processes clearly active ones.

Horsetail diversity

From preliminary herbarium evidence in the Krylov Herbarium at Tomsk, I had hoped to find at least some horsetails during our journeys, but what I had not expected was the abundance and diversity which horsetails showed almost everywhere we stopped across Siberia. Indeed, each time we stopped for a rest-break on the long journeys to and from the Altai, once the students with us realised that I was interested in horsetails it became a challenge to see who could return to the van after a few minutes break clutching the most interesting horsetail, which we then identified en route! It was impressive to find that *Equisetum pratense*, itself rare and northerly in Britain, appeared to be the most abundant everwhere in Siberia, followed by almost all the other species not far behind. Both *E. pratense* and *E. sylvaticum* reach impressive individual size in lowland and upland habitats. *E. fluviatile*, in association with other water-margin plants, forms extensive associations along lowland river margins and especially in ox-bow lakes. Within the Altai region, luxuriant growths especially of *E. hyemale* and *E. variegatum* (Fig.10) occurred along some of the white sandy and gravelly spits beside the fast-flowing mountain torrents of the Katun river, carrying turquoise glacial meltwater even in summer from high in the Altai. Challenged by me to look for a morphological intermediate, one of the students found *E. x trachyodon*, which I was able to confirm, not previously recorded in Russia, as were several other of our hybrid horsetail finds across Siberia. These I pickled in Vodka for further study!

CONCLUSIONS

Conclusions from the field week in Siberia were threefold:-

1. Under environmental conditions which we think of as extremely severe, the Siberian vegetation was in fact luxuriant, to a degree which I had never previously comprehended. Its ferns are no exception. At generic level, there are some extraordinary species complexes that make many of ours in the west look relatively simple. At species level, my analogue of the Siberian flora being like that of Scotland *on steroids*, also remains vivid in my memory. The Russian pteridologists are currently studying their pteridophyte complexes in detail, and there is much yet that we shall learn.

2. Set in the magnitude of a landscape of continental dimensions, it was both the sheer size of the landscape and the pristine-ness of its vegetation that I found overwhelming. You constantly felt that you were stepping,

to quote a mixed English metaphor, where the 'hand of man' had never previously trod. Within this vegetation, the extensive ecological role which pteridophytes played, from different fern diversity on the forest floor and cliff-faces to horsetails along the riversides, to the detailed sites of life-cycle turnover, closely approached that which I have only previously experienced to the same degree in the tropics. I was impressed.

3. Against this backdrop, I found the field skills of the Russian botanists to be overwhelmingly superb. Their entirely independently home-grown and strongly field-oriented perspectives, were ones from which I learned much and was greatly stimulated. These skills, based on detailed repeated observations, passed on to their students, make many exclusively laboratory-based approaches used in the west seem dramatically disengaged from the reality of the field. Here, we have much yet to learn.

Finally, I found all of the Russians I met, most friendly and welcoming, and, after the week in the field, I felt I had become an extra part of their pteridological team. Seeing Siberian pteridophytes in the excellent company of so many young Russian botanists was, for me, a great privilege which I knew few, if any, previous westerners must have had the fortune to experience. I felt the Russian students were, in many ways, exactly the same as my students back in Britian and I am left with a strong realisation that we have seldom actually appreciated this. My great thanks to Professor Irina Gureyeva for making possible my lectures and this whole experience. ❐

Monitoring photographs of *Woodsia ilvensis*

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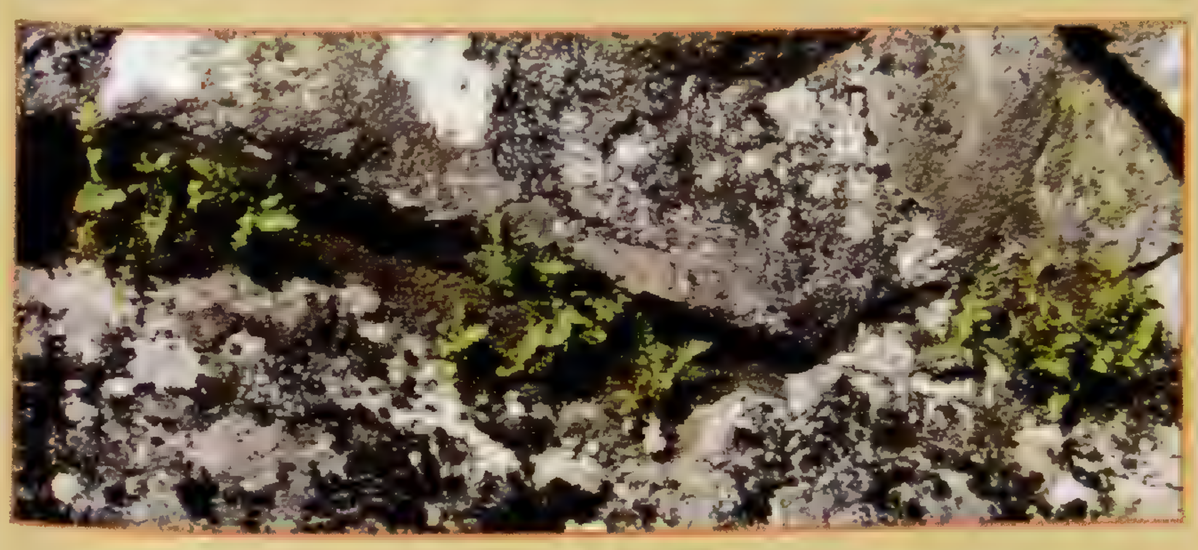
The three wild sites of *Woodsia ilvensis* in Scotland have been visited by botanists over a long period. There are probably many people who have photographed them and it would be interesting to put the photographs together. We only have a series, as shown below, that spans ten years. Anyone with photographs of *W. ilvensis* is invited to send a copy to the Royal Botanic Garden Edinburgh to add to the existing archive (or we can copy and return).

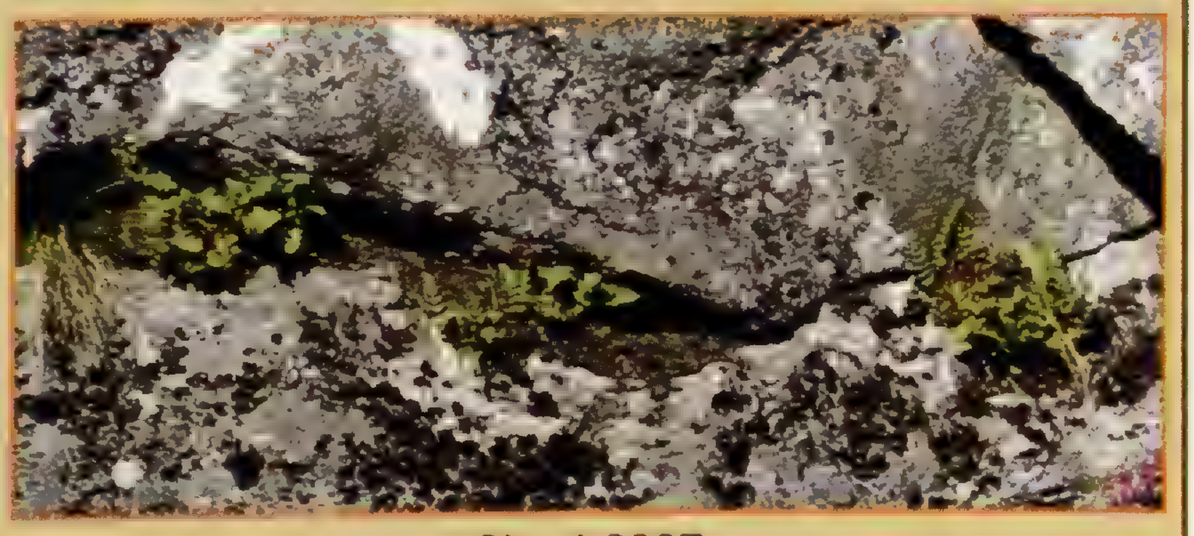
This series shows *Woodsia ilvensis* at one of the sites in Corrie Fee. It can be seen how the size of the clumps varies and individual crowns, especially the one of the right of the middle clump, have diminished. It can also be seen how difficult it is to count the number of 'plants' as a big clump fragments and might appear to be a larger number of separate individuals . ❐

Site 1 1996

Site 1 2005



Site 1 2003



Site 1 2007

(For further information visit the B.P.S. website at http://www.nhm.ac.uk/hosted_sites/bps/photorec/precnotes.htm - Ed)

Notes on Altaian ferns

Irina Gureyeva
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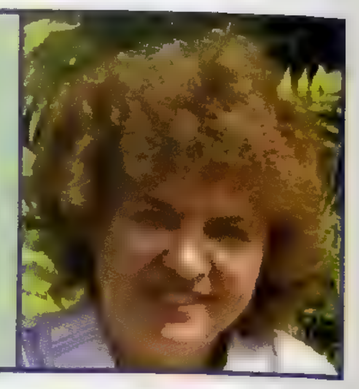

Fig.11 *Woodsia calcarea*

Fig. 12 *Woodsia ilvensis*.

Fig.13 *Lepisorus albertii* (Regel) Ching (Photo by Yu. Ovchinnikov)

Woodsia R. Br. is an interesting and taxonomically difficult genus. I think that South Siberia is one of its centres of speciation and diversity. At the moment we do not know exactly how many species exist in this region. The situation with *Woodsia* is also not clear in the Ural and Caucasus Mountains. Nearly 20 *Woodsia* species have been recorded at different times for the Russian territory. Currently I have a postgraduate student studying this genus in Russia and I hope that he will be able to make it more understandable. Most Russian *Woodsia* species inhabit the Southern Siberian mountains, especially the Altai-Sajan region, and mountains of the Far East of Russia. (Fig. 11 and 12)

Lepisorus albertii (Regel) Ching (Fig. 13) is a very unlikely fern for Siberia, although there are more *Lepisorus* species in the Far East of Russia. *Lepisorus albertii* is endemic for the Altai and is a very rare species. It grows in moss pillows on rocks (especially limestone rocks), which are protected by thick snow cover in winter. The snow and moss protect the *Lepisorus* fronds and especially the rhizome during winter. The mean winter temperature in the Altai is about -20°Centigrade, but it can drop to -30° and even -40° Centigrade (the absolute record in the Chuiskaya steppe in the Altai is -56.6°C). Previously most authors placed this fern in *Lepisorus clathratus*, but recently it has been established that *Lepisorus clathratus* only occurs in Central Asia. The Altaian *Lepisorus* is a different species which was described by Regel as *Polypodium albertii* in 1881. Lectotypus of this species is in the Herbarium of the Botanical Institute of Russian Academy of Science in Saint-Petersburg (LE),

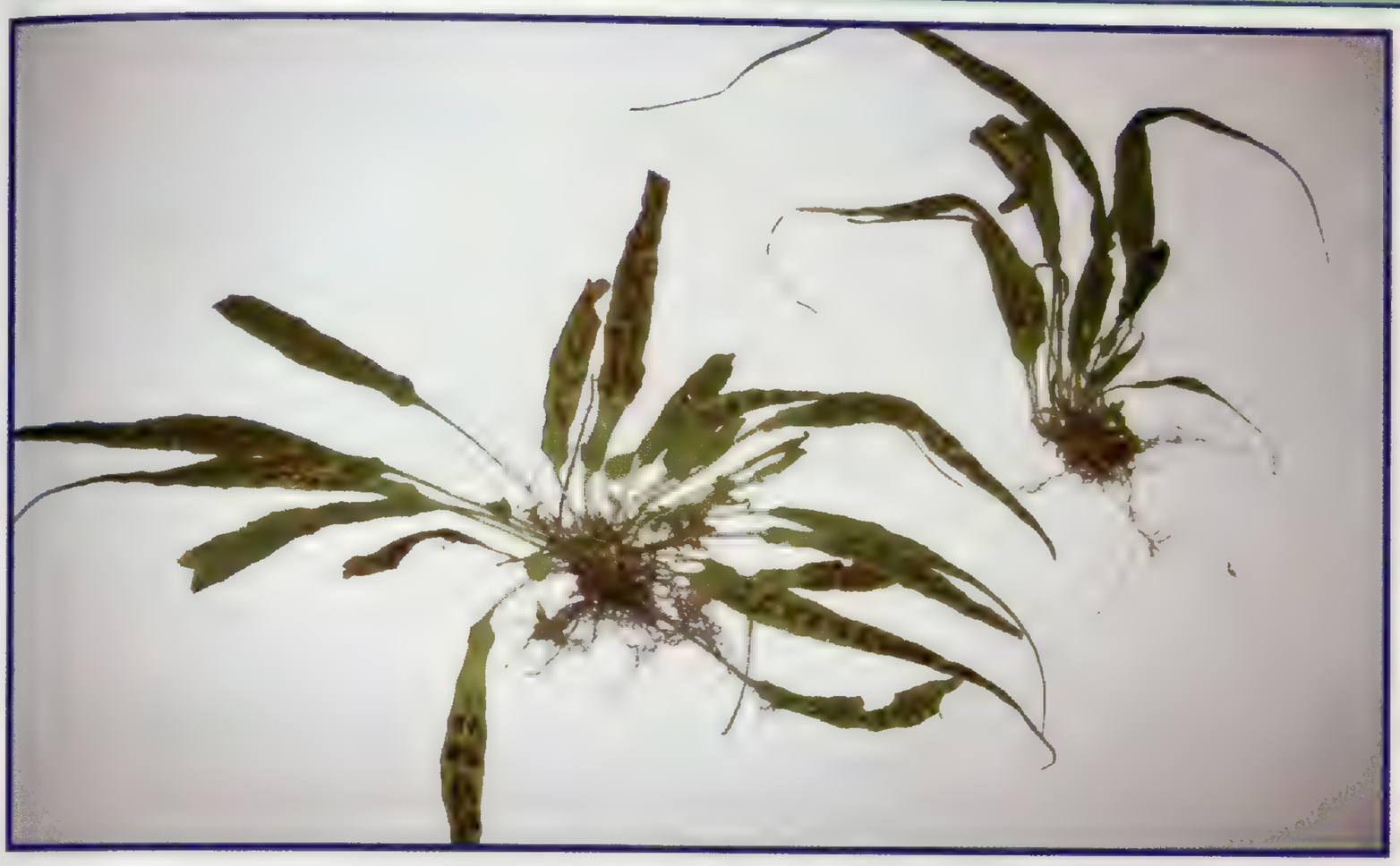

Fig.14 *Camptosorus sibiricus*

Fig. 15 *Asplenium altajense*

but recently, in 2007, I discovered the isolectotypus of this species in Kew Herbarium (K).

Camptosorus sibiricus Rupr. (Fig. 14) is another unusual and fascinating fern from Siberia. It is a small rock fern, which occurs sporadically from the Far East of Russia to the Altai, throughout this range it is rare. There are only two *Camptosorus* species in the World. One of them - *Camptosorus sibiricus* - occurs in the South-East Asia (including Siberia), the other - *Camptosorus rhizophyllus* (L.) Link. - occurs in the south-east of North America. *Camptosorus* has an interesting peculiarity: The tops of adult fronds proliferate into a braid-like stolon with a bud arising at its tip. On coming in contact with the soil, the bud grows into a daughter sporophyte.

Asplenium altajense (Kom.) Grub. (Fig. 15) is a very interesting species, which was described from the Altai, lectotype of this species is keeping in Krylov Herbarium. This species occurs mainly in South Siberia, where it grows in rock crevices. ❐

Fantastic fern window grill

This fabuluous piece of metalwork, noticed by Adrian Dyer, was screwed over a door window, in Pimlico. Even though it is covered with many layers of paint the detail is superb. Below is a close up of the croziers:-

It is possible that this was cast metal work - anyone seen any others anywhere?

Ferns from the Galapagos Islands.

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Fig.1 One edge of the westerly Los Gemelos crater in mist, showing rim vegetation including *Polypodium tridens*

I imagine that by now only a handful of people will be unaware that this year signals two Darwin anniversaries. He was born 200 years ago, and 150 years ago his seminal "On the Origin of Species" was published. Some of the initial seeds for this great work were planted in his mind during his journey on the Beagle between 1831 and 1836. Of the many places visited, the most famous are the volcanic Galapagos Islands in 1835. Here he noticed that on different islands, seemingly similar organisms varied in small degrees, the well known examples being the giant tortoises, mockingbirds and finches. Ironically, in his collections of the latter he failed to document properly their islands of origin, and it was only later that ornithologist John Gould recognised the significance of their variations. Indeed, they were different species, and now, after painstaking work by scientists in the 20th century, 13 species of what have come to be known as Darwin's finches are recognised.

Mainly because the Galapagos are hotbeds of evolution, much scientific work has been performed there since Darwin's time. One focus of study has been to identify 5 different ecological zones based on climate and plant communities (see Wiggins and Porter 1971 for much more on this). Starting at sea level, these are –

- Littoral Zone. A narrow strip by the sea where organisms are adapted to the influence of salt. There are no ferns in this zone.
- Arid Zone. This zone is characterised by small trees and spiny shrubs. The prevailing winds are south easterly, resulting in rainfall at lower levels in southerly facing slopes. Here the arid zone extends to about 100m, but on north facing slopes to about 250m. There are virtually no ferns in this zone.
- Transition Zone. Intermediate between the former and following zones. Ferns start to appear here.
- *Scalesia* Zone. Using the southern slopes of Santa Cruz as the example, this zone starts at about 180m above sea level, and extends to 450m or so. As its name implies, it is dominated by the evergreen trees in the genus *Scalesia*. It receives rain in the wet season, and experiences fog in the dry season. Understorey plants are damp-loving, and include ferns.
- *Miconia* Zone. This is a zone of lower rainfall, dominated by shrubs such as *Miconia robinsoniana*, and extends say between 450 – 550 m above sea level.
- Fern-Sedge Zone. This is the highest zone, and reaches to the tops of the peaks on the larger islands. Although most of the rain will have fallen in the *Scalesia* Zone, this zone receives fine drizzle and fog. As its name implies, it is dominated by sedges and ferns

The Galapagos is an extremely popular tourist destination, receiving about 200,000 visitors a year. Most visitors live aboard ships which ply between the islands visiting the designated tourist trails. Unsurprisingly, these itineraries are highly regulated –

Fig.2 *Polypodium tridens* showing division of lower pinnae.

Fig.3 *Cyathea weatherbyana* within the crater, with more *Polypodium tridens* to the left.

Fig.4 The attractive *Doryopteris pedata* var. *palmata*.

each site can only be visited if accompanied by a guide, one must keep to the trails, and in order to regulate the flow of visitors, each site visit has to be booked months in advance by the ships' operators. Despite all of this, the Galapagos Islands are wonderful places to visit. In November 2008, Lesley and I were fortunate to be amongst the multitude of visitors, and lucky enough to be on a splendid vessel with only 8 other tourists. The boat was large and comfortable, and the crew were magnificent – nothing was too much trouble. During our 7 days stay, we saw all of the charismatic life forms – marine and land iguanas, giant tortoises, waved albatross (beautiful and endearing creatures), boobies, and many others. The finches were charming but difficult to identify (even by our guide!) We were introduced to many interesting plant species, but what of the ferns?

The main inhabited island is Santa Cruz, and following our flight from Ecuador, and transfer to our boat, in the afternoon of this first day we went ashore again and headed inland to the *Scalesia* Zone. This was the only time we visited any zone other than the Littoral and Arid Zones. Aware that this might be the case, I asked our guide Fabian if we could see the tree ferns, and he agreed. The area we visited was adjacent to the main north – south island road, and consisted of a large crater, one of two called Los Gemelos ("the twins") (Fig.1). The vegetation was *Scalesia* forest, with many epiphytic and understorey plant species, including a good scattering of ferns. The trail was fairly short, but Fabian took us a little off the main trail to see a group of the endemic tree fern *Cyathea weatherbyana* (Fig.3) nestling within and near the edge of the crater. It was impossible to get close to them, and so their trunk formations could not be seen clearly, but we managed some photographs of the fronds. Another BPS member and friend Alan Ogden saw what I think was the same group of the tree ferns on his 2003 visit to the Galapagos (Ogden, 2003). But we were both tourists, and as such denied the opportunity of seeing further stands of *C. weatherbyana* which exist on this and five other islands (Lawesson et al 1987). Quoting from the discussion in Wiggins and Porter 1971 of the Fern-Sedge Zone "But again, the outstanding spectacular plant of the Fern-Sedge Zone is the endemic tree fern *Cyathea weatherbyana*, which occupies ravines, deep swales, pockets at the bases of slumped cliffs, and large potholes. In such habitats, often inaccessible without ropes, the plants are all the more tantalizing. In all of these areas the lacelike patterns of the immense fronds produce graceful arches, casting shadows that are at once a delight and a despair to the photographer or artist." This evocative passage from what is basically a scientific book produces a yearning to see such places, but it is hardly surprising that they are not on the standard tourist itineraries! Interestingly, *Cyathea weatherbyana* is the only tall growing plant in the Fern-Sedge Zone, so it should be easy to spot.

During the rather hurried Los Gemelos visit, I attempted to observe and photograph as many ferns as possible. In situ identification was not possible with the time available, and collecting (of anything) was forbidden. In spite of this I did manage subsequently to put names to one or two of the species. Apart from the tree fern, most interesting (to me) were the large stands of *Polypodium tridens*. (Fig.2) We were visiting in the dry season, so some of the fronds were withered. What intrigued me about this endemic species was the way the lower pinnae divided (yes often into three lobes), not something I recall seeing before in a fern. *Polypodium phyllitidis* (Fig.5) looks just like our scollie (but of course is not) so much so that the common name is the Hart's-tongue Polypody! And I noticed several specimens of the attractive *Doryopteris pedata* var. *palmata*. Other ferns and lycophytes seen were *Adiantum macrophyllum, Asplenium feei* (and two other Aspleniums which I could not name from rather poor photographs), *Blechnum occidentale* var. *puberulum*, *Lycopodium clavatum* (to quote Alan Ogden a "beautiful club moss which looked like a grove of dwarf pine trees"), *Nephrolepis cordifolia*, and *Pteris quadriaurita*. There were many others, but frustratingly it was impossible to examine these closely in the

Fig.5 *Polypodium phyllitidis* masquerading as a group of scollies.

Fig.6 *Polypodium tridens*

Fig.7 *Cyathea weatherbyana*

time available.

The Galapagos ferns and lycophytes are described in the standard Galapagos flora (Wiggins & Porter, 1971), with some later revisions and additions (van der Werff 1977), and an updated list by Lawesson et al., 1987. According to the latter, there are 112 fern and lycophyte taxa (including 7 endemics) on 13 of the islands (Wiggins & Porter recognise and list the total number of islands as 45). However, the most numerous records are restricted to the higher islands of Fernandina, Isabela, Pinta, San Cristobal, Santiago, Santa Cruz and Santa Maria. Apart from the two endemics, my modest fern list from Santa Cruz consists of species that are fairly widespread and common in tropical regions, demonstrating the ease with which fern spores can travel long distances across open seas. Most of the Galapagos flora originates from the tropical Andean region (Adsersen, 1990) where ferns make up about 2.5% of the vascular flora. However, in the Galapagos, ferns account for about 23% of the flora, demonstrating the relative ease with which spores can cross oceans. But the tables are turned when considering Galapagos endemics. Here, only 6.2% (7 species) of the ferns are endemics, whereas in the spermatophytes endemics account for 44.4%. Adsersen's explanation for this is that "immigration of [fern] species may be so rapid that empty niches are filled more readily by immigration than by evolution, and repeated invasions of spores from species already in the islands may inhibit speciation by adding "conservative" genetic material to the island populations". This all seems highly plausible to me. According to Large and Braggins, 2004, *Cyathea weatherbyana* is similar to the neotropical *C. andina*, which could therefore have been the original coloniser species from which the new species has only slightly evolved.

Ferns are apparently quite common in the Fern-Sedge zone, so much so that in Itow, 1990, 3 of the 6 floristic communities recognised are identified by the names of ferns and lycophytes – the *Pteridium aquilinum/Blechnum polypodioides* community, the *Lycopodium clavatum* community, and the *Polypodium tridens* community, and in all 6 communities, fern species are very well represented.

But what did Charles Darwin make of the Galapagos flora? Well initially, not a lot – "Although I diligently tried to collect as many plants as possible, I succeeded in getting very few; and such wretched-looking little weeds would have better become an arctic than an equatorial flora" (Darwin, 1860, on San Cristobal). He was visiting the Galapagos in the dry season, when most Arid Zone shrubs are indeed twiggy, spiny and leafless. However, he did have second thoughts later – "The botany of this group [of islands] is fully as interesting as the zoology. Dr. J Hooker will soon publish in the Linnean Transactions a full account of the flora --- ". In that publication, the first monograph on Galapagos plants (Hooker, 1847a),

Ferns from the Galapagos Islands.

209 Darwin collected plants were described, of which 19 were ferns, 5 being new to science - but he did not find *Cyathea weatherbyana* which was unknown to science at the time. However despite Darwin's assertion that the botany and zoology were of equal interest on the Galapagos, his main focus whilst on the Beagle was geology and zoology, and these received the most attention in subsequent publications.

I could easily contemplate a fern focused visit to the Galapagos, but would have more difficulty imagining the logistics and red-tape involved. Nevertheless, I would be delighted to hear from anyone who has visited the Galapagos with a more specialised itinerary, or anyone who might be interested in doing so to see ferns. After all, they are present in relatively high proportions, so we should not have to search through acres of spermatophytes to find our quarry! ❐

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Did you know? (Extracts from the first Pteridologist) by Jimmy Dyce (Written in 1984!)

The most expensive book on British ferns is the folio edition of Thomas Moore's *Nature Printed British Ferns*. The price rose rapidly a few years ago and is now fluctuating about the £500 mark. (Now in 2009 up to £20,000!)

In Britain our fern with the most restricted distribution is *Cystopteris dickieana* -(excluding the Channel Islands)

Our tallest fern, *Pteridium aquilinium*, can grow up to 12 feet, and more when it gets some support.

Our most beautiful wild species (MY choice) is *Dryopteris aemula*.

The most prolific producer of varieties is the Lady Fern

E.J. Lowe recorded and described 1861 fern varieties in Britain. (A very large number of them were not worth recording and today would be thrown on the compost heap!)

A fully grown soriferous plant of the Lady Fern, Male Fern or Soft Shield Fern can produce up to and over ONE THOUSAND MILLION spores in one season. (See extract from the writings of C.T. Druery in the 1983 Bulletin, Vol. 2 No 5).

There are 50 fern species in Britain (excluding hybrids and allies).(What is it today? Ed.)

One single spore has been known to produce SEVEN plants, all of a most interesting new fern variety.

Our most common fern is (no prizes for guessing this one!) - *Pteridium aquilinium.*

C.T. Druery was the most prolific writer on British ferns. As well as three books, all still very popular, he left us eight huge quarto 'scrap books' of his press cuttings.

One of F.G. Heath's books, the *Fern World*, ran to *twelve* editions.

THE FIRST RUSSIAN PTERIDOLOGICAL CONFERENCE

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The conference logo with a very similar central design to that of the BPS using the attractive fronds of *Aleuritopteris*

During August 2007, the first ever Russian Pteridological Conference was held in Tomsk State University, Tomsk, Russia. Approximately 35 delegates (with a total of 46 in the authorship of the papers) gathered for three days of lectures, followed by an optional excursion to see the pteridophytes of the Altai Mountains, on the border of south Siberia and Mongolia, (see separate report in this *Pteridologist*). Both the lecture and field meetings were highly successful, bringing together pteridologists from all parts of Russia, literally from Moscow and St. Petersburg to the Far East of Russia (between which Tomsk, in Siberia, is relatively central). I had the honour of being one of only two non-Russian participants at this otherwise entirely home-grown gathering (the other was from the Ukraine).

My objective in going to Russia was to try to experience first-hand, through this meeting, the level of interest in pteridological research across this enormous country, and get to know a little of its focus and diversity as represented at this unique first gathering. If I could possibly sense whether the establishment of any closer east-west links would be felt to be useful to the independently-formed interests in pteridology in Russia, then any such developments might help to bridge what has previously been a traditional barrier to scientific information flow in both directions.

So after arriving in Moscow, and changing planes to a further Russian internal flight continuing overnight eastward, I arrived in the remote city of Tomsk early one morning in mid-August, with a mixture of excitement and some initial trepidation. How good it was to be met at the airport by a friendly face!

THE LECTURES

Although I had not previously been to Russia, nor had any previous plans to do so, initial diffidence on my part was rapidly overcome by the realisation that I was honored by being scheduled to give the opening conference lecture the following morning. Also, after three days subsequently meeting Russian pteridologists and listening to many fascinating presentations, I was invited to then close the meeting with discussion about its contents and future direction. Barriers of language had initially concerned me. But thanks to the enormous support of the Conference organiser, Professor Irina Gureyeva, and the additional extremely able daily help, throughout the conference and beyond, of a fluent and scientifically highly competent translator, Yelena Zuyeva, any potential barriers were not just overcome but were effectively dissolved. Thus I found I could even participate in discussions. Indeed, the liquidity which we collectively achieved surprised me. What might otherwise have been difficult, in actuality became a wonderful opportunity for exchange of experience, especially around field-related aspects of Pteridophyta, on which many Russian pteridologists are especially closely focussed. I am left with several important impressions about the lectures:

Presentation. Lectures varied widely in their duration, and the conference benefited greatly, I felt, from not having the rigid timetables which we are used to (and usually over-running) in the west. For example, several young scientists were able to give short (5-10 minute) presentations of work, and these were intermixed with longer research papers, some clearly the results of many years of dedication. This made for great interest of listening, and sequences never became boring. Many were helpful in indicating work actually proceeding, rather than all necessarily representing complete final papers. All, it seemed to me, were presented extremely professionally and confidently, even by the many young people.

Depth and level of detail of studies. Despite these great variations in length, depth of topics covered seemed particularly thorough, direct but never over complex. Speakers also had no difficulty in demonstrating where their studies were going and what they would be doing in future. There was a clear level which balanced professionalism with informality, and this was refreshing. Characteristically, all were also beautifully illustrated, with considerable information presented diagrammatically, so that if I lost the thread in detail I could still grasp much of the theme from combinations of the illustrations and plant names used! So I seemed to understand far more than I thought I would.

Diversity and focus. The total diversity of topics covered within the Pteridophyta was wide. Subjects fell into two broad groupings: essentially floristic / phytogeographic / ecological / conservational and essentially taxonomic / biomorphologic / developmental / populational / demographic. Each of these general fields has considerable importance in Russian pteridology, and I was impressed by the diversity of the topics within each area, including several aspects to which in the West we have given much less study. At least one especially in-depth developmental study drew important phylogenetic conclusions on a refreshingly entirely non-molecular basis, which really caught my attention as an important foil to some more abstract western ideas that fail entirely to look beyond a test tube.

The magnificent setting for the first Russian Pteridological Conference, Tomsk State University, Russia. August 2007

Importantly, a majority of papers had clear field-related foci and often, from this basis, included both observational and experimental work. I think it is especially in this important area that Russian pteridology is both factually rooted and clearly excels. Healthy discussions followed many presentations, and several times authors were keen to know how their ideas compared with, and would be viewed by, pteridologists in the West. With clear, considerable, sometimes novel, and often eye-opening interest was my general conclusion.

OVERALL PTERIDOLOGICAL IMPRESSIONS AND CONCLUSIONS

I was really honoured to have been invited to participate so fully both in the lectures and in the subsequent field week (*see separate report*) of Russia's first ever pteridological conference. The whole conference was thanks to the foresight, vision, organisational ability and sheer hard work of Professor Irina Gureyeva, Director of the Krylov Herbarium of Tomsk State University, who conceived that the time was right to call for a Russian pteridological conference, and to Professor Alexander Shmakov, Director of the South Siberian Botanical Garden at Barnaul, who organised the field week and its accommodation and travel throughout. Without their own individual endeavours none of this would have been achieved and I am particularly grateful to both for their invitations and arrangements for me to participate. Further, Tomsk State University generously funded my travel to Russia in return for my giving a series of seminars on world conifers and ferns, and especially their field and tropical aspects, to their own staff and students, which seemed to work surprisingly well.

At the human level, three things struck me strongly in looking around the Russian pteridologists. First, their is a far greater proportion of women in Russian pteridology - men are a definite minority. The second was the friendly and relatively informal, but well-organised, atmosphere in which both the whole conference and the field meeting seemed to run, and I came to feel very much part of their team. The third thing I noted is that when I look around at our meetings in the West, there is always a bias towards a demographic age class of more mature individuals, of which I am certainly no exception. When I looked around the Russian participants, I was struck by how very many young faces there were, who gave interesting presentations, were eager to discuss the plants as we went and who, in the field, were often the first to disappear up mountainsides with great enthusiasm and sharp-eyed success.

All the events were memorable experiences, and I am left with the impression of a strong and growing interest in Pteridophyta within Russia as a whole. Following the dissolution of any political barriers to contact, I felt that there was much eagerness to link more closely with the West. I would say too, from this experience, that pteridology in Russia has its own, independent strengths. Its strong dedication in relating results to field aspects is, I felt, especially important in areas so heavily overlooked here. Its approach provides a necessary foil to some of the more abstract molecular interpretations made in the West. It was just my sort of pteridology, in which the occurrence of not a single cladogram was allowed to interrupt logical thought processes, and emphasis was always on gaining greater understanding of how pteridophytes do what they do, function, and achieve what they do in the field.

The Proceedings of the Conference itself have been published in a small and neat volume in Russian, and at the end of the conference, the possible formation, from here on, of a Russian Pteridological Society was being discussed. By experiencing the enthusiasm of the many young members, I saw that pteridology has now a strong and diverse future in Russia. In closing the conference, I congratulated them all on what they had achieved and the directions in which they had chosen to go, which were collectively of a quality at least on a level comparable to the West, have their own strengths, and indeed, I felt, benefited greatly by their differences. I wished the many young participants especially, of whom I feel sure we will hear more, a long and successful pteridological future. ❐

Tectaria Mystery Solved

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Fig.1 *Tectaria heracleifolia* at Bosque Alegre in Costa Rica, 2008

I am one of those people who is easily distracted, especially if I should be doing something particularly arduous or difficult. In English lessons at school I would often get the dictionary out and end up being sidetracked by an interesting word rather than finish the task in hand!

The other evening I had a few lengthy tasks ahead of me, but I decided I needed a break; it was after 6pm so I did not feel guilty about taking the evening off for once.

My relaxation was to pick up a range of journals that needed reading before being confined to the shelves. I had recently secured a back run of the *American Fern Journal* and had reached vol. 9 (1919) and was reading the exploits of our cousins across the pond. On page 81, I came across Texas Pteridophyta-3. Having returned from Texas in Autumn 2007 I was interested in details, such as name changes and whether I would still be able to picture images of the names listed. Of course I was sidetracked. There was a fern listed as *Tectaria trifoliata*. Now why had our host Naud Burnett not led us to this fern in 2007? I opened one of the books Naud had provided us with: *The Ferns and Fern Allies of the Trans-Pecos and Adjacent Areas*, the only *Tectaria* was *T. cinnamomea,* a synonym for *Osmunda cinnamomea*.

Baffled, I took down that hefty tome the *Flora of North America, Vol.2.* In the index there were 4 tectarias but no *Tectaria trifoliata*. I felt sure that it had to be there, at least as a synonym. I took a quick scan through the listed species, their synonyms as well as their distribution. Too quickly I fear, because all I saw was the arrows pointing at Florida. So it was back in the *American Fern Journal* . In volume 11, I found a note that the recorded finder of the tectaria, Ernest Palmer, quoted that Lindheimer had first collected the plant in 1847, long before Palmer had rediscovered it in 1919.

Back to *Flora of N. America* and the literature cited mentioned neither Palmer nor Lindheimer, which surprised me as the latter has a *Cheilanthes* named after him. I then remembered Naud had produced a facsimile copy of the *Ferns and Fern Allies of Texas.* In it I found *Tectaria heracleifolia* and the synonym *Tectaria trifoliata*. As it mentioned both Florida and Texas I thought for a moment I would have to write to the illustrious Robin Moran and tell him he had missed an important location for this plant.It was just as well that I checked back in the *Flora of North America* because under distribution for *Tectaria heracleifolia* it had those 3 little letters 'Tex.', and on closer look at the map there was a grey smudge over part of Texas to show its range.

In the reference at the end of *Ferns and Fern Allies of Texas* there was a reference to Ernest Palmer, *American Fern Journal,* 24 (1934). Here I discovered the marvellous tale of how, with the scantiest details of Lindheimer`s find in 1847, Palmer made his way across Texas on the train. He had heard of the rare fern and how a cowboy had found it and sold it to a lady in San Antonio (of Alamo fame). Palmer then took the mail coach with his field gear towed in a trailer behind. Unfortunately, in the early hours of the morning, the coach could not manage with the trailer and it had to be left behind.

Early the following morning, in the small outback town of Montell in Uvalde County, Palmer made enquiries about the fern only to find that everyone knew the tale of the cowboy and the money he had made - and they were all very suspicious of strangers. Despite a difficult day in the field, including chasing off rattlesnakes, he finally found the plant just before dusk. He arrived back at his hotel between 10 and 11 o'clock at night. Sounds just like one of our tours!

So why was it not mentioned in *Ferns and Fern Allies of the Trans-Pecos*? As luck would have it, its recorded site is in the next county east of the Trans-Pecos boundary!

For the record *Tectaria heracleifolia* is found on limestone in deep railway cuttings and cave entrances in Texas, but on woodland floors further South where the society has come across it in Trinidad and Costa Rica in recent years. It especially likes the dark shade found in these areas. ❐

CHATSWORTH - A SURPRISING FERN LINK WITH THE PAST.

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Members of the Yorkshire Fern Group were in for a surprise when they visited Chatsworth Gardens last summer. Paul Ruston our Meeting Leader had noted on his pre-visits a large cavernous void covered by a metal grille. On the walls below, tantalisingly out of reach, luxuriant growths of ferns could be seen in the half-light, begging for closer inspection. So Paul, using all his silver tongued powers of persuasion, approached the head gardener who very kindly granted permission for us to descend and explore this underground paradise. We were in fact the first members of the general public to go down there for over three quarters of a century!

Fig. 1 The tantalising view through the opening

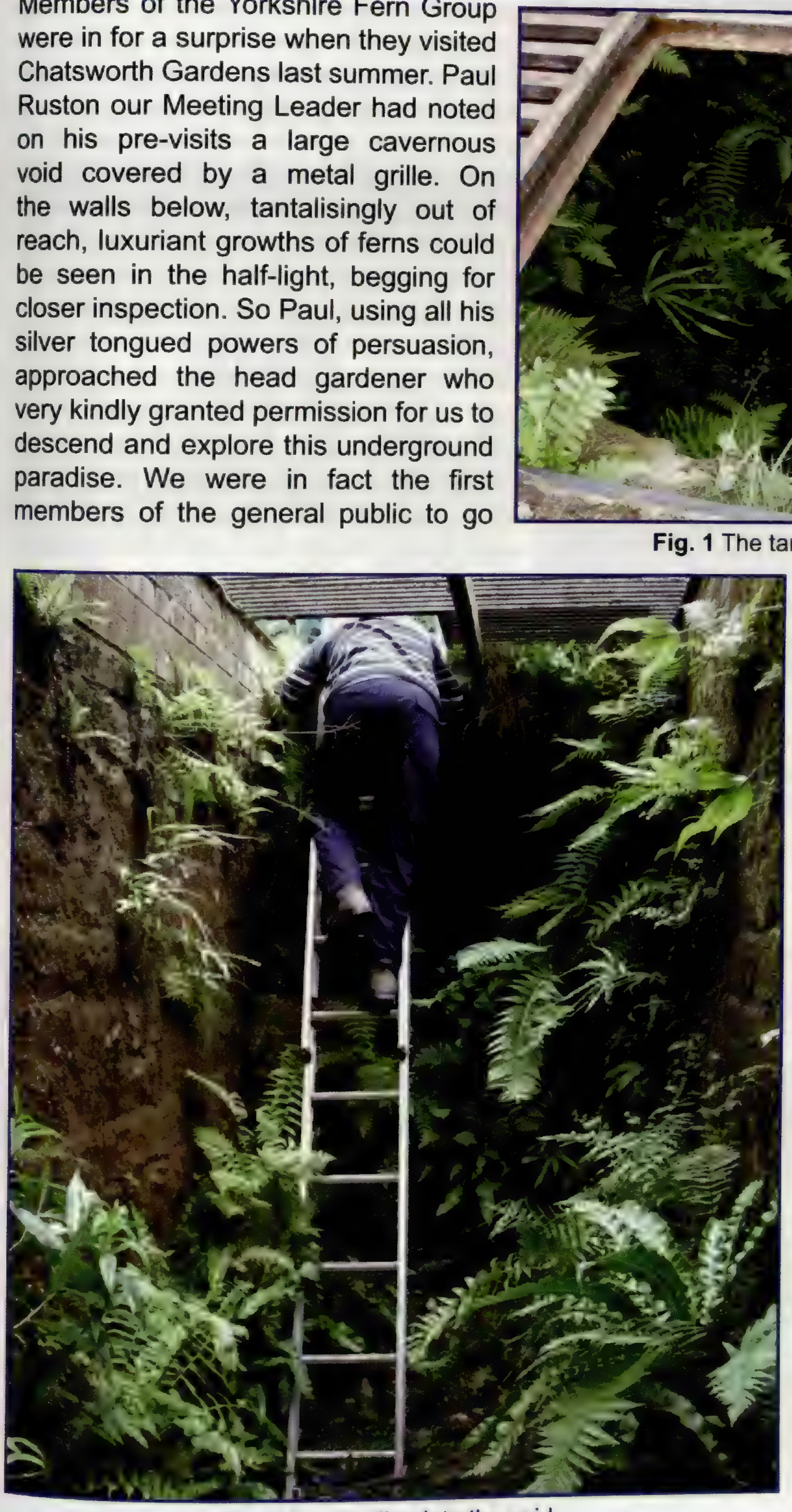

Fig.2 Descending into the void.

We need to go back to 1836 to get to the origin of this. Paul's researches show that this was the year the Great Conservatory (or Great Stove House as it was initially known) was started, a huge glasshouse covering three quarters of an acre and without doubt Joseph Paxton's great masterpiece at Chatsworth. This period was the golden age of plant hunting and Paxton and the 6th Duke of Devonshire were actively involved in the acquisition of all manner of 'goodies' such as *Amherstia nobilis* and lots of orchids from the tropical and sub-tropical regions of India and further east to fill their new Conservatory. One example was a Sago Palm which was reputed to weigh in at 12 tons and a cart with eleven horses was required to deliver it. Ferns were a feature throughout the structure; the pillars of the Stove were decked with hanging baskets flowing with maidenhair fern and rock works burgeoned with all manner of exotic varieties, unfortunately not recorded. There were even tropical birds flying freely through the tropical

Fig.3 Gently crested form of *Pteris cretica*

Fig.4 *Pteris nipponica*, synonym *Pteris cretica* 'Albo-lineata'

Fig.5 *Pteris cretica*

Fig.6 A slightly different form of *Pteris cretica* with *Asplenium scolopendrium* and *Cystopteris fragilis*

vegetation.

Eight large coal fired boilers were required to maintain this exotic environment in the Conservatory and a network of corridors and tunnels were constructed below ground to provide the ventilation system and a railway for conveyance of fuel and ashes. Our remaining 'hole' left today is but a small part of this. During its time the Great Conservatory was very successful with enthusiastic comments from notable visitors including Queen Victoria and Charles Darwin, but the onset of the First World War proved to be its downfall. Reduced manpower led to neglect of the tropical plants that had previously been so lovingly cared for, and the cost of fuelling the boilers (300 tons of coal during the winter) became too expensive. So in 1920 the structure was finally brought to its knees, ironically with explosives after other methods of demolition failed. Now the only reminders of the past are the sandstone foundation walls where the harts-tongue, polypody and maidenhair spleenwort have blended in with their russet tones, and of course the remaining fern decked underground cellar.

Which brings us back to our visit. On our arrival a small part of the grille was opened and a ladder was provided for us to descend the 10 feet down to the bottom. Once there it was surprising how much light actually filtered through to this sheltered environment, and we took no time at all in inspecting and photographing the ferny delights abounding on the walls and edges of the stone floor. There were lots of Pteris, especially *P. cretica* along with some *P. nipponica*, and *Selaginella kraussiana*. Luxuriant growths of familiar native ferns included *Athyrium filix-femina, Dryopteris filix-mas, Asplenium scolopendrium, A. trichomanes* subsp. *quadrivalens, Cystopteris fragilis,* and *Polystichum aculeatum*

So looking back on this delightful and possibly unique occasion for our members we record our thanks to Ian Webster, the head gardener of Chatsworth, for his generosity in making the arrangements and allowing us permission to visit this fascinating remnant of Chatsworth's Great Conservatory. ❐

Fern Postage Stamps from the Faroe Islands

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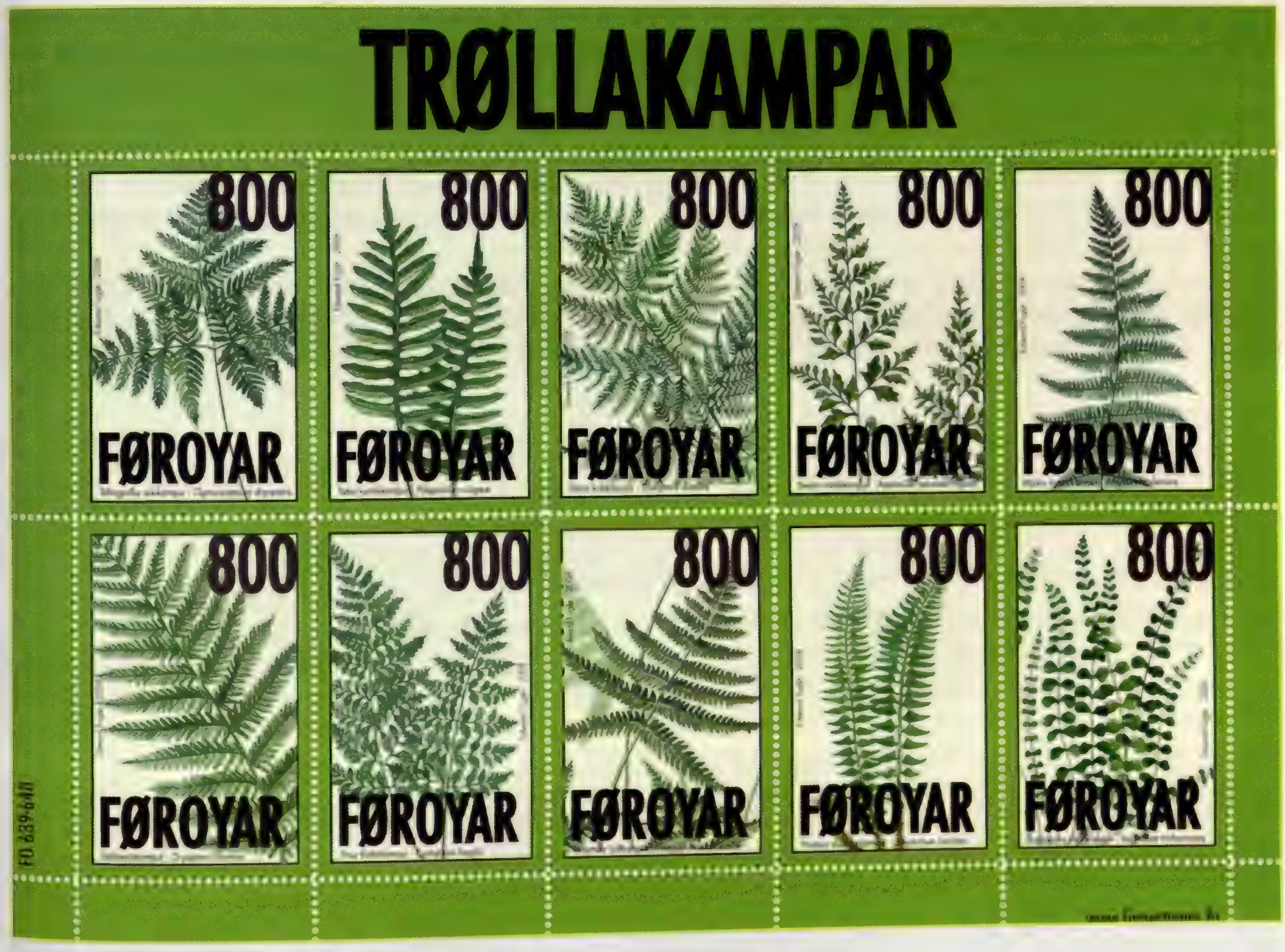
I cannot speak from personal experience, but I believe the Faroes to be stark, windswept, treeless islands, but with a rough beauty typical of such wilderness places. I did visit Shetland many years ago, and remember being struck by its open spaces, sweeping bays and wonderful seascapes. I imagine the Faroes to be similar, and both island groups have interesting floras. However, as one might expect from their location and treeless topography, these islands' fern diversity is relatively low, with only 28 species of ferns and lycophytes recorded from the Faroes (*Flora Nordica, Volume 1,* 2000). Despite this, the Faroes postal authorities decided to feature 10 of their species in a set of stamps issued on 22 September 2008. The species depicted are shown in the illustration and listed below from left to right, top to bottom. The quotations are comments from Flora Nordica.



Top row: Left to right:
Gymnocarpium dryopteris. "Streymoy (Tryglabrekka, Tórshavn)".
Polypodium vulgare. "Fairly common in the lowlands".
Dryopteris dilatata. "Scattered".
Asplenium adiantum-nigrum. "Southernmost Eysturoy (Rituvík and Toftavatn)".
Athyrium filix-femina. "Fairly common in the lowland".

Bottom row: Left to right:
Dryopteris filix-mas. "Fairly common in the lowland, rare in the highland".
Cystopteris fragilis. "Common in low- and highlands".
Phegopteris connectilis. "Single localities on Vágar, Streymo, Eysturoy and Viðoy".
Polystichum lonchitis. "Rare in the north-eastern islands".
Asplenium trichomanes subsp. *trichomanes*. "Southernmost Eysturoy".

Fern Postage Stamps from the Faroe Islands

To publicise this stamps issue, the Faroes postal authorities (Postverk Føroya) published a short article in their then current newsletter (reproduced also on their web site). Therein, they stated that there are 15 ferns in the Faroes. This I think is actually correct, and consistent with Flora Nordica. Let me explain. The word Trøllakampar at the top of the stamp sheet is Faroese for fern, and apparently means "troll's beard" (I will leave you to work that one out!). By "fern", in common parlance I think they mean plants excluding lycophytes, and the fern genera *Botrychium, Ophioglossum,* and *Equisetum* – i.e. plants that we also might colloquially think of as "true ferns". This being the case, there are only five omissions from the stamp set (quotations again from Flora Nordica) - *Hymenophyllum wilsonii* ("scattered to rare on most islands except in the northeast"), *Athyrium distentifolium* ("Borðoy (Depilsknúkur)"), *Dryopteris expansa* ("Fugloy (Eystfelli 1961)"), *Blechnum spicant* ("common on nearly all islands, especially at lower altitudes"). The fifteenth "fern" is *Asplenium scolopendrium* which, according to the Postverk Føroya article, was only discovered in 2007 at Norðuroyggjar. Although it is described in Flora Nordica from Norway, Sweden and Denmark, its occurrence in the Faroes was then unknown. Finally, I was amazed to note that bracken does not occur in the Faroes – perhaps they are lucky!

The fern artist and stamp designer is Edward Fuglø, a native Faroese who has designed several of the recent Postverk Føroya stamp issues. He also illustrates books and posters, has designed theatrical sets and costumes, and has exhibited widely in the Nordic countries as well as Ireland and Shetland. Under magnification, his fern paintings seem fairly crude, but work well when reduced to stamp size. They are reasonably good likenesses, although I think the images of *Gymnocarpium dryopteris* and *Dryopteris dilatata* are a little too lacy, and the arrangement of the lower pinnae of *Cystopteris fragilis* is not quite correct. I would also take issue with the distracting size of the lettering, perhaps provided more for the benefit of the postman than for the aesthetic quality of the stamps.

The stamps are available in three forms – sheetlet mint, sheetlet cancelled, and first day cover with sheetlet, at 80, 80 and 82 Danish kroner respectively. They can be obtained from Postverk Føroya, Philatelic Office, FO-100 Tórshavn, Faroe Islands, e-mail filateli@postverk.fo, web address www.stamps.fo.

My own interest in stamps has been an adjunct to my overseas travel, and for many years now I have been collecting natural history stamps of the countries I have visited. A few of these depict ferns, but I am not (yet) a methodical collector of fern stamps. For those with such an ambition, I would recommend James Montgomery's article "Ferns on Postage Stamps" published in the American Fern Society's Fiddlehead Forum, volume 31, no. 1, January-February 2004. Therein, he has documented all the stamps depicting ferns of which he was aware at that time. Fern stamps have only featured once before in the pages of this journal – a short note by Jimmy Dyce in 1986 on an Irish fern stamp issue. Perhaps we would have more articles if BPS members added stamps to their fern memorabilia collections. ❐

Footnote; During the run up to our centenary in 1991 Jimmy Dyce and I decided it would be a good idea to try and persuade our Post Office to publish a set of fern stamps. With the Committee`s support Jimmy did all the hard work and tried to interest the Post Office. I think you know we failed! Ed.

CARRYING OUT TRIALS IN YOUR GARDEN.

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You might have seen television presenters on gardening programmes encouraging you to carry out trials in your garden. I have seen one in which you have to grow single plants in 3 different composts, then at the end of the growing season you look at them and say 'well this one has grown quite well but this one is not so good' - this is a pretty hopeless design!

For any meaningful trial you need to have replicates, for example, if you wanted to grow ferns in different composts you would need to grow a minimum of 5 plants (but better 10) of the same species, in each compost, and grown under the same conditions. Depending on what you want to find out you would also need to have some sort of control. In addition you would need some way of actually measuring the growth of the plants grown in these different mediums. You need proper measurements to carry out any basic statistical analysis. This is more straightforward than it seems.

With the number of BPS gardeners growing ferns up and down the country we could potentially pool

our knowledge and learn a lot more about growing ferns by carrying out simple trials in our gardens. Such experiments may well reveal trends which could then be more rigorously tested using more tailored experiments. For example, we are always being encouraged not to use peat in our composts but how will ferns do in the alternatives? I have very little actual soil in my Buxton garden and so have to grow a lot of my ferns in pots. This year I am going to carry out a simple trial; it is a good way of using all those excess sporelings you don't want. I would be delighted if I could encourage any other members to run a comparable trial, we could then compare results next year.

What you would need.

1. A minimum of 15 (preferably 30) young ferns of the same species.
2. Clean pots of the same size for all your trial plants. The choice of pot-size will depend on the size of plant you are starting out with.
3. Three composts:
   B&Q grow bag compost is cheap and adequate, or use standard multipurpose:
   a. peat-free
   b.with peat
   c.coco compost
4. Ruler and permanent marker pen.

What to do.

1. Pot up the plants and number the pots with permanent marker pen; you could use labels but these can get moved around and mixed up; don't forget to also mark the pot with the compost type. Make a table as shown below.
2. Measure the plants in mm:
   a. Length of longest frond on each plant.
   b. Maximum width of longest frond
   c. number of fronds.

and record these measurements in your table together with the start date and which species you are using.
3. Grow on all the plants in conditions which are suitable for your species. If you really need to feed make sure you give them all the same (make a note of the date) but it would be a better test of the compost if you refrain from feeding.
4. After a period of good growth, this will vary according to your chosen species, measure the plants again and record these measurements, together with the date, in your table. If you have a digital camera take a picture of the best plant grown in each compost.

Compost	Replicate No	Frond length start date	Frond length finish date	Frond width start date	Frond width finish date	Number of fronds start date	Number of fronds finish date
Peat-free growbag or multipurpose	1						
	2						
	3						
	4						
	5						
With peat growbag or multipurpose	1						
	2						
	3						
	4						
	5						
Coco compost	1						
	2						
	3						
	4						
	5						

5. Send the results to me and I will collate these and carry out the statistics – gulp!
If we get any interesting results we can publish them in next years Pteridologist.

Good Luck. Any inquiries or results to:
Yvonne Golding secretary@ebps.org.uk
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A national collection of *Asplenium scolopendrium*

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I have been collecting hartstongue cultivars for twenty five years and February this year I was given full national collection status.

My interest in searching out diversity from the normal species came from my grandfather. He was an ordinary working class bloke, but a botanist at heart. I would go for walks with him through meadows in the countryside and he would send me off to find wild flowers with extra petals or with other differences. Later in my twenties I worked in a long stay hospital for people with learning disabilities and would take the folk out every day for walks down the country lanes. The high banks were always covered in hartstongue ferns and I longed to have some in my garden.

Coming from Yorkshire the first real fern lover I met was Jean Marston at her nursery at Culag in Driffield. She kept her ferns well protected in a shade house and she made you feel very privileged as she led you in to see her pets. I always thought she was keeping a watchful eye as she escorted you around the fern cultivars and she was definitely very protective of them. Jean did have some beauties and I remember seeing a lovely *Asplenium scolopendrium* 'Spirale' there. She had some for sale at one point but they did not survive in my garden in West Sussex. Jean kindled my interest in hartstongues but it was not until I received my first box of mail order ferns from Fibrex that I was hooked. They had sent me a terrific example of a ramosum that I still have to this day.

There were only a few nurseries offering cultivars of *Asplenium scolopendrium* at that point and today there are even less. As well as Fibrex, Kaye's Hardy Ferns was well established and Reg's grandson Dominic had started offering mail order again and over the next few years I was able to buy some choice cultivars from him including 'Drummondiae'. Hazel and Martin Rickard had started to build up their nursery and I would wait with great anticipation for their annual catalogue's list of cultivar specials. A favourite from them was 'Crispum Fimbriatum'.

Closer to home I discovered a nursery now down the road from me in Hampshire. plantsman Mr Giles of Rumsey Gardens always had a good selection of hartstongue cultivars that he had grown from spores. The best had to be a cristatum form which I think is 'Corymbiferum' which had a beautiful cocks comb as a crest.

Initially I found it frustrating trying to build up the collection as many of the nurseries had different names for the same plant. I had sent off by mail order for 'Muricatum', 'Marginatum' and 'Angustatum' only to find that when they arrived that they were all 'Fimbriatum'.

I have grown many of my own cultivars from the BPS spore exchange and got into the habit of mixing up the spores to try to create new forms. This method can create weird and fantastic plants. Lowe in his book *Fern Growing* reckoned that a fern could have as many as four parents and demonstrated by showing photographs of the qualities of each parent in the same plant. I am not sure about this but some strange and wonderful forms do appear. Take one that is just settling down here, it is 'Muricate, Sagittate' and crested and this year its fronds are split and fold back on themselves like cupped hands and at times it looks like a Venus flytrap. If it continues to show these qualities I shall call it 'Venus'.

Fig.1 As yet unnamed spore raised cultivar, fronds crested and fimbriate.

At the moment I have 48 named cultivars of scolopendrium and others that still need sorting out and naming. It is difficult to fit some plants into groups either, they carry the qualities from cultivars of many of the other

Fig.2 Wild 'Crispum' found in woods near Petersfield in autumn of 2006

Fig.3 Close up of wild find 'Crispum' showing width of frond November 2008.

groups, or do not fit into any of them.

I have two different hartstongues whose first set of fronds in the season are very different to subsequent ones. One plant which came from Rumsey Gardens in Clanfield starts off with a massive crest resembling conglomeratum or glomeratum in the Victorian fern books but then later it becomes more sagittate in character. The other raised from spores begins with very narrow but thick finger like projections but later produces wider fronds of a different character. I always feel like cutting off the latter fronds as they spoil its uniqueness.

As less specialist fern nurseries are offering a range of cultivars I feel one of my roles as a national collection holder is to propagate the rarer ones in my collection in order to make them more widely available and stop them becoming lost.

Division is possible when only a small number of plants are required otherwise propagation is probably best by taking frond bases. A larger number of plants can be grown from bases and they are replicas of their parent. They can be grown much quicker than from spores.

I have had success from taking frond bases at various times of the year. I usually call in propagation expert John Finch to help. The hartstongue is dug up and the soil washed from the roots revealing the frond bases, the stubs of what is left from previous years fronds.

These are snapped off and put upside down into sterilised sand in a pot and then into a supermarket resealable bag. Small buds start to appear after several months and then tiny plants grow from these. A year later the new plants are ready to pot up.

I mulch the hartstongues at least once a year, usually in the spring, and feed with blood, fish and bone and calcified seaweed at intervals throughout the year. I have started giving a foliar feed once a month of liquid seaweed, which seems to ward of the fungus Milesina scolopendrii a condition which leaves black spots on the upper frond and white dusty spores on the underside, it also gives the plants a boost.

Having a collection of ferns means there is always something to get excited about whether it's the latest batch of sporelings or a plant that has started to grow in some extraordinary way like the crispum wild find which I am very proud of. This season it has also produced cresting and its fronds measure five inches in width which indicate that it is sure to be a giant. ❐

Asplenium scolopendrium 'Drummondiae'

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Fig.1 Possible *Asplenium scolopendrium* 'Drummondiae'

Fig.2 *Asplenium scolopendrium* `Crispum Fimbriatum Bolton'

In order to meet the requirements of a national collection I enrolled the help of John Finch to propagate and divide some of my long established hartstongues. For a national collection three plants are needed of each cultivar.

Two years later I was examining the *Asplenium scolopendrium* 'Drummondiae' plants that we had divided and was disappointed to see that some of the plants had fronds that were not sagittate. I thought that somehow they had lost this feature but then after reading some of Druery's books I was surprised to read that 'Drummondiae' was not sagittate as I thought. So what were the other plants bought as 'Drummondiae' but also sagittate?

The original plants had been bought from Dominic Kaye's nursery in Silverdale and would have been raised from his grandfather Reg's stock. Looking over my old fern books I read that Charles Druery in *British Ferns and their Varieties* reported 'Drummondiae' was found by Miss Marion Drummond in 1861 about a mile from Falmouth.

In another book, *The Book of British Ferns* he gives two descriptions of 'Drummondiae'. Firstly as a "*singular, compound variety in which the fronds are very long and narrow, finely frilled and bearing in addition broad, flat digitate crest often nine inches across. Another peculiar feature is that the midrib is deeply undulated several times perpendicular to the plane of the frond and finally the margins of the frills are deeply cut into long fimbriate projections.*"

Secondly, and perhaps more simply, as… "*A unique fern; fronds long and narrow, some fimbriate, some plain with broad spreading crests, fronds undulate, switching back fashion. The fimbriations are aposporous and yield true progeny, some of which throw only the fimbriate fronds*".

This does sound like one of my 'Drummondiae' plants however, further investigation has revealed that the sagittate plant is almost certainly `Crispum Fimbriatum Bolton' raised by Bolton from 'Crispum Fimbriatum' of Cropper. This in turn may be the same fern as illustrated on page 36 of the 2008 *Pteridologist* as 'Crispum Subfimbriatum Cristatum'. Hopefully one day there will be a registrar for *Asplenium scolopendrium* cultivars and names for all our cultivars will be standardised.

This was a nice surprise as it means I have two types rather than one but whether they are the plants mentioned by Druery or offspring from them I have to guess. ❐

Fern Recording – A Personal Scottish Experience

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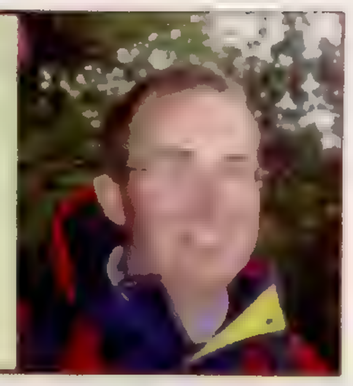

Fig.1 *Athyrium distentifolium* var.*flexile* on Meall a Bhuiridh at the head of Glencoe.

Fig.2 *Polystichum lonchitis* on Sgurr a Gharaidh near Lochcarron

Chris Page's series of articles on recording in recent issues of this magazine[1] have excellently covered all aspects of the subject and I do not want to go over old ground. My purpose here is to talk about my (so far limited) experience of fern recording from a personal Scottish perspective, in the hope that it might be useful to others.

Motivation

It started a few years ago when I realised that, although there was a lot of experience of fern recording in the BPS[2], no one, with the exception of the professionals, still seemed to be continuing the practice, and, as we know, professional pteridologists are becoming increasingly rare. As for the BSBI Vice-County Recorders, all I have met have been enthusiastic and happy to record ferns, but inevitably their primary interest is going to be on flowering plants. We needed a new focus on recording ferns as such (and Chris Page's articles have been timely in this respect) and who better to do this than ourselves, the BPS membership? And where better to start than in that fern paradise we call Scotland?

From a personal point of view, just as writing reports for the Bulletin enhances the experience of the fern outings themselves, I realised that formal recording would give an additional, richer experience to field trips than just admiring the beauty of ferns. If that sounds pompous, try it for yourself and see what I mean. For a start, it helps ensure accurate identification, entails a detailed examination of the plants, and encourages a greater awareness of the surrounding vegetation and terrain.

In addition, like all people keen on the natural world, I was, and remain, acutely concerned about the possible effects of global warming on our fragile earth, but did not know what I could do to increase the general awareness? Well, at the very least I could record and monitor the ups and downs of ferns on my home patch, for, as Page says, "*…they are of potentially high indicator value, especially of change.*"[3] Through recording over time we can amass real facts with which to counter the global warming doubters or, as the case may be, the exaggerators. There is nothing like a few hard facts gained from personal experience to win over an argument.

However, I also had a more selfish purpose. As BPS Scottish organiser I rack my brains every year trying to devise a programme of field outings to suitable ferny sites, and whereas in Scotland we're not exactly short of ferns, I clearly want to find the places richest in species or rarities. By recording at sites we do go to, I can build up a list of ferny hot spots that we can revisit from time to time and thus fill slots on future programmes. Lazy of me, I know, but a good idea nonetheless. (Allied to this is the Where to See Ferns in the

Field Outing Record Card (Scotland)

Location	V.C.
Grid Ref	Date
Recorder(s)	
Habitat Description	

	Asplenium adiantum-nigrum	
	Asplenium ceterach	
	Asplenium marinum	
*	*Asplenium obovatum*	
	Asplenium ruta-muraria	
	Asplenium scolopendrium	
*	*Asplenium septentrionale*	
	Asplenium trichomanes	
	Asplenium viride	
*	*Athyrium distentifolium*	
*	*Athyrium distent. var. flexile*	
	Athyrium filix-femina	
	Blechnum spicant	
	Botrychium lunaria	
	Cryptogramma crispa	
*	*Cystopteris dickieana*	
	Cystopteris fragilis	
*	*Cystopteris montana*	
	Dryopteris aemula	
	Dryopteris affinis	
	Dryopteris borreri	
	Dryopteris cambrensis	
	Dryopteris carthusiana	
*	*Dryopteris cristata*	
	Dryopteris dilatata	
	Dryopteris expansa	
	Dryopteris filix-mas	
	Dryopteris oreades	
	Equisetum arvense	
	Equisetum fluviatile	
	Equisetum hyemale	
	Equisetum palustre	
*	*Equisetum pratense*	

	Equisetum sylvaticum	
	Equisetum telmateia	
*	*Equisetum variegatum*	
	Gymnocarpium dryopteris	
*	*Gymnocarpium robertianum*	
	Hymenophyllum tunbrigense	
	Hymenophyllum wilsonii	
*	*Ophioglossum azoricum*	
*	*Ophioglossum vulgatum*	
	Oreopteris limbosperma	
	Osmunda regalis	
	Phegopteris connectilis	
*	*Pilularia globulifera*	
*	*Polypodium cambricum*	
	Polypodium interjectum	
	Polypodium vulgare	
	Polystichum aculeatum	
*	*Polystichum lonchitis*	
	Polystichum setiferum	
	Pteridium aquilinum	
*	*Thelypteris palustris*	
*	*Trichomanes speciosum*	
*	*Woodsia alpina*	
*	*Woodsia ilvensis*	
	Diphasiastrum alpinum	
	Huperzia selago	
*	*Lycopodiella inundata*	
	Lycopodium annotinum	
	Lycopodium clavatum	
	Selaginella selaginoides	
*	*Isoetes echinospora*	
*	*Isoetes lacustris*	

* Rare or scarce – complete an Individual Species Record Card

- Tick off all species seen on a field outing and complete the boxes at the head of the page.
- Use a separate card for each distinct location.
- Send a copy of the completed sheet to your BPS Regional Organiser who will compile a yearly summary.
- For species marked with an asterisk, or for hybrids, unusual sub-species or other rarities, complete a separate Individual Species Record Card.

(Version 4)

Fig.3 Field Outing Record Card

Wild project, the first entries for which, I hope, will be published on the web site in the near future.)

Preparation

I discovered that the BPS had a pre-printed record card[4]. A5 in size with a tick list of the British species, it seemed perfectly adequate for the job, but, needless to say, I felt it could be improved. For a start, the print size is too small for aging pteridologists' eyesight. The species list contains pteridophytes unfamiliar to me and which do not occur in Scotland (*e.g.*, *Anogramma leptophylla* and *Selaginella kraussiana*) and some of the species names are not up to date. The card calls for a habitat code to be selected from a NCC list which I felt amateurs like me would not be fully familiar with. A re-design was called for.

It seemed sensible to have a checklist of Scottish species only and not clutter up the card with mention of plants we would never see. In this way also I could highlight ferns rare specifically in Scotland even though they might be common in other parts of Britain (*e.g.*, *Polypodium cambricum* or *Thelypteris palustris*). The advent of Global Positioning Systems meant that more accurate grid references could be recorded. The use of an A4 size would allow for larger, readable print. And computer technology would enable the possibility of regular updates at no cost and free availability to all.

I sought advice from fellow BPS members and BSBI officials[5] and soon realised that two separate record cards were needed – one as a general Field Outing Record (Fig. 3) and a separate Individual Species Record (Fig. 4) for rarities, hybrids, aliens, etc., which would be sent with a verified voucher specimen, if necessary, and appropriate photographs to the local BSBI VCR (Vice-county recorder) for formal recording. This is in fact in line with BSBI practice. (Whereas it would be nice for the BPS to maintain our own records and eventually produce an atlas based on our own findings, we really are too small an organisation to do this properly, and the BSBI is the official botanical record keeper with the necessary resources.)

Jim McIntosh of the BSBI in Scotland was particularly helpful, giving me copies of BSBI leaflets[6] and record cards, and suggesting headings for the Individual Species Record, such as *Number of plants* or *Area of occupancy*, *Evidence of regeneration*, *Associated species*, etc. (But, in truth, although these things are nice to know, the key points, as Fred Rumsey informed me, are the species, the place, the date, and the recorder.) After a few amendments the new cards (Scottish versions) were ready and are reproduced here. I usually print them back to back on thin card. Copies can be obtained from me and can easily be amended to suit your own area. In truth they could do with a more competent graphic artist than I am to tidy them up – any volunteers?

Implementation

We had of course always made a list of everything we saw on field trips for the *Bulletin* report, but now with the new record cards in hand we are doing it more formally and methodically. Results from the Field Outing Records are collated afterwards on a spreadsheet report and emailed annually to the appropriate VCRs. Computerised versions of the Individual Species Records are emailed to the VCR as soon as possible

Individual Species Record

Use this card for rare or scarce species, and sub-species, hybrids and aliens

Species, sub-species or hybrid name (If in any doubt seek expert verification)

Location | **V.C.**

Grid Ref (2 letters/8 figs) | **Date**

Recorder(s)

Voucher specimen collected? Yes / No

(Only take voucher specimens if absolutely necessary for identification and if the plant can sustain the loss, but never from protected species i.e. *Cystopteris dickieana, Dryopteris cristata, Trichomanes speciosum, Woodsia alpina & Woodsia ilvensis*)

No. of plants/crowns/fronds/Area of occupancy

Slope and aspect

Evidence of regeneration

Threats and damage

Associated fern species (& other plants) within 10 metres

General habitat description

- Only record if certain about identification. An incorrect record is very difficult to undo.
- Complete all sections and submit a copy to the local BSBI Vice-County Recorder.
- Where possible accompany submission with photographs, both close-ups of identification features and general views of the site to aid relocation.

(Version 5)

Fig.4 Individual Species Record

accompanied by digital photographs, both close-ups to verify the species and more general shots to aid relocation. We do not record in the gardens we visit, though there must be a case for doing this also in order to find out which ferns (native and alien) are growing where: surely of interest to fern growers.

In the field we face a few problems, and it would be interesting to hear how others overcome these elsewhere. The A4 size is awkward and I usually end up folding it. Recording in the rain, a not unusual occurrence for us, presents real difficulties, though I have found that pencil is more water-resistant than pen. Holding simultaneously record card, pencil, camera and GPS (to say nothing of rucksack and walking pole) is next to impossible: co-operation from your fellows is essential, and I am grateful for the willingness of Scottish members to engage in the task enthusiastically, although they do not always, understandably, take to be being bullied into volunteering by me.

The accuracy of GPS is not always as exact as we might like. Accuracy to only ±15 metres, or even ±30m, is not uncommon. Overhead trees or cliffs (just where ferns like to grow) block out satellites, making readings impossible altogether. But generally using GPS is better than trying to guess your position from the map, though Alex Lockton of BSBI warned me against using site centroids. "*If you record over a large area, just give the 4-figure grid reference. The important thing is that the plant must be within the grid square named.*"

In our first full year of formal recording (2007) I submitted a spreadsheet to the BSBI containing 195 individual records, some rare, some mundane, but a healthy total. 2008 had a lesser total, mainly because we visited more gardens that year. I have to confess that it is a bit of a bind collating the records on to a spreadsheet, but with superhuman efforts to overcome my innate laziness, not impossible. I must see if I can persuade someone more interested in making lists to take on this task.

Continuation

What of the future? We will, of course, continue to record and submit results, and gradually build up a data-bank of information that can be used for monitoring, *i.e.*, the revisiting of sites from time to time to assess the numbers and condition of the ferns, horsetails, and clubmosses present. We have already begun this task for *Woodsia alpina.* Based on a survey carried out by John Mitchell in the 1970s we have over the past few years been monitoring various sites at the western end of the Breadalbane Hills. Armed with copies of Polaroid photos, marked up by Mitchell and his colleagues, we have been able to re-find, or note the absence, of individual plants, and, gratifyingly, record the arrival of new plants. We have one more site to visit, and then we will start the process over again so that each site is monitored on a regular basis.

With the demise of Polaroid cameras this method of recording the position of individual plants is no longer possible, though I understand that Polaroid have introduced a portable, pocket-sized printer that works with digital cameras (including mobile phones). As yet the print-out is too small to be of use for our purpose but larger models may come on the market. In any case it is possible to mark up photos afterwards from a sketch

done at the time. (Not so easy in the rain!)

Overall we must be doing a good job, and again I must thank those who participate on our Scottish outings, as we have been asked by RBGE to assist them in monitoring the even rarer *Woodsia ilvensis*. That starts next year but inevitably access will be restricted to a few at these fragile sites. However, while it remains important to monitor rarities, and especially significant, as Fred Rumsey points out, to record hybrids[7], it is equally important to record the common stuff and by default what is not there. ❐

Endnotes and References:

1 **Page C.N. (2005)** Why Record Ferns? *Pteridologist* 4: 120-122; (2006) How to Record Ferns. *Pteridologist* 4:154-156; (2007) Recording Ferns part 3. *Pteridologist* 4: 188-189.

2 See, for example, **Busby, A.R**. Pteridophyte Records. *BPS Bulletin* 1978-1981.

3 **Page C.N. (2005)** Why Record Ferns? *Pteridologist* 4: 120.

4 Originally designed by Rob Cooke, it should still be available from the BPS.

5 I am particularly grateful to Fred Rumsey of NHM, Heather McHaffie of RBGE, Alastair Wardlaw, Adrian Dyer, Jim McIntosh, BSBI's Scottish Officer, and Alex Lockton, BSBI's Data Manager.

6 Including: **Dines T.D. (undated)** Fieldwork for Atlas 2000, 4: *A Beginners Guide to Recording*.

7 See **Ackers G. (2006)** Report on Autumn Indoor Meeting. *BPS Bulletin* 6: 387.

Book Notes

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The Seuffert Legacy, New Zealand Colonial Master Craftsman. The craft of Anton Seuffert and his sons William, Albert and Carl. By Brian Peet.2008, 208 pp.,19.0 x 25.5 cm. Many illustrations, most in colour. Icarus Publishing, Auckland. Enquiries to the author at: *peetfamily@orcon.net.nz* .

In the past the magnificent works of art produced by the Seuffert family have been mentioned or illustrated in the *Pteridologist*, (briefly by me in 1986, pp. 121,123 and 1991 p. 85, and more fully by Jennifer Ide in 1999 pp. 79-86, and 2000 pp. 133-140). In this beautifully produced book, privately published by the author, all the known types of wonderful marquetry fern albums and fern adorned furniture created by the Seufferts are comprehensively described. It is recommended reading.

(I would like to thank Jennifer Ide for making me aware of this book.)

Flore des Mascareignes, La Reunion, Maurice, Rodrigues, Pteridophytes. By F. Badre. 2008. 452 pp., 17.0 x 24.0 cm. 69 b. & w. plates and 4 col. plates. Published jointly by Institut de Recherché pour le Development, Paris; Mauritius Sugar Industry Research Institute; The Royal Botanic Gardens, Kew. Paris 2008. Available from Kew, price unspecified but 40 euros in Europe.

Sadly no fern flora was available when the BPS recently visited the island of Reunion. Now, only two years later, we have the publication of this full fern flora. It is well produced and very comprehensive, but it is not a coffee table or picture book. For pretty pictures you may do better to refer to Edmond Grangaud`s article in this issue of the *Pteridologist*. It is written in French. Presumably french is the majority language on all three islands, certainly Reunion is French speaking. Sadly this may reduce sales in the UK.

For the purposes of our visit Edmond produced an extensive information pack for our guidance. Reassuringly, comparing this with the flora, I can find no discrepancies. Although inevitably the information provided here is far fuller than anything Edmond could do as an information pack. Whilst in Reunion with Edmond I never heard mention of *Cyathea grangaudiana* , endemic to Mauritius - and I am particularly interested in tree-ferns. How typically modest of our host that he did not mention this new species named in his honour!

Edmond is also in the process of producing a more copiously illustrated book on the ferns of Reunion. I cannot wait to see it. I suspect the two books will complement each other handsomely.
Needless to say, a visit to the fern paradise that is Reunion is highly recommended especially now since this comprehensive flora is available.

(I will give a full review of this book in a future issue of the *Fern Gazette*)

Gay Horsetails

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Fig.1 Gaily coloured pteridophytes. Top-left: *Blechnum fraxineum* Willd., Ecuador. Right: *Osmunda cinnamomea* L., Canada. Bottom-left: *Huperzia crassa* var. *manus-diaboli* Øllgaard

What distinguishes the pteridomaniac from the average floral-oriented naturalist is that they can do without the gaudily coloured flowers of the seed-bearing tribe. Instead they revel in the abundance of shapes, architectural designs and microscopic details. Yet it is not all green on our side of the botanic spectrum: there are ferns with variegated leaves, blue-shining *Selaginella*, pastel coloured *Osmunda*, and where the red ferns grow, red club mosses are not far away (Fig.1).

When I was a fourteen year old boy, I eagerly tried to find all the varieties, forms and monstrosities that the late 19th century authors so kindly lumbered us with. Great was my joy therefore, when one day I found a single shoot of the Field horsetail (*E. arvense* L.) that was entirely as red as a weathered brick. According to my battered photocopy of the *Flora Neerlandica* (Weevers et al., 1948), this was forma *sanguineum* Luerssen, defined by the red stems and branches. I duly picked it and kept it in my herbarium, where within two years it lost all its fancy colour and remains grizzly-green to this day. Such a completely red horsetail I have never seen again, but otherwise green stems adorned with a hint of red at some tastefully picked out places appear not to be exceedingly rare at all. Especially the Shore horsetail (*E.* x *litorale* Kühlew.) frequently is of a colour more cheerful than just dull green (Fig.2). Since mainly the cone-bearing stems show the pink, one would be tempted to think this to be the contribution of the pale to pink fertile stems of the Field Horsetail to the intermediate character set of the hybrid Shore horsetail. However, Christopher Page (1997) writes about the Water horsetail: "*The main stem sheaths* [*of* E. fluviatile] *are tight, and their green is frequently tinged with orange, a colour characteristic amongst the* deciduous *horsetails of only this species and its hybrids*" (p. 444). This is illustrated in Fig.3, although I'd have a hard time telling where the orange stops and the pink begins. So, as far as I am concerned, the occurrence of orange (or pink!) on the sheaths of the Water and Shore horsetails goes without dispute, but what I wondered about was, whether this colouration would

Fig.2 *Equisetum* × *litorale* Kühlew

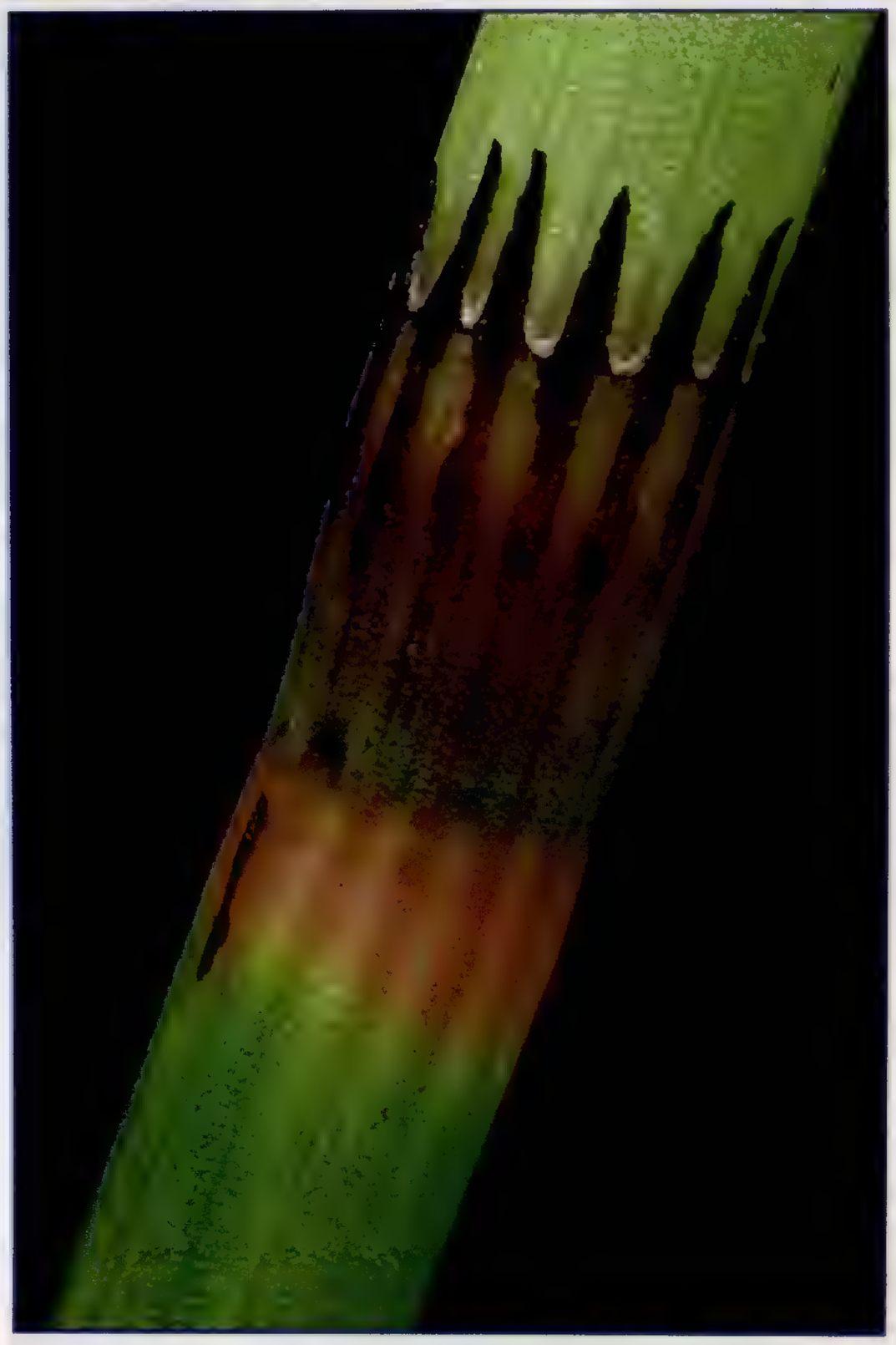

Fig.3 *Equisetum fluviatile* L.

be exclusive to the Water horsetail's parentage.

Near Moose Factory in the North of Ontario (Canada), I found an island where nearly all the Field horsetails (*Equisetum arvense*) were equipped with clearly pink barren stems (Fig. 4). The ones with green stems, though often growing side by side with the pink ones, were exclusively of the Arctic type, with decumbent green shoots and short, erect fertile shoots provided with green branches. The pink is vivid, contrary to the fertile stems, that were still present due to the short growing season in this sub-Arctic climate, and had the colour of yellow ochre. Never before I have seen an entire population with such pink stems, but I have noted elsewhere green-stemmed clones with some pink(-ish) stems, for example in the Netherlands and on Harris. At the latter location the pink appeared to be a passing stage, the youngest shoots having the most intense colour. I don't know what the Canadian population looked like later in the year: the ice and subsequent flooding had only recently receded, so possibly nearly all the shoots were of the same, young age. Milde (1865) describes a form, [var.] *varium*, with slender, erect stems, short branches, and the internodes half dark green, half brick-red. The print of the same looks like a rather young stem too. Luerssen (1889) lists this form from a number of scattered locations in Central-Europe and adds that the colour keeps well if the plants are dried quickly. Bad luck for me again - in the dismal North-Canadian weather the newspapers in the tent got wet and the most colourful tint left are various shades of muddy brown.

Maybe the moment of chlorophyll production in this horsetail is just somewhat variable. Such a variability would account for ageing fertile stems turning green and for barren stems that are initially pale. The red colouration might then be a temporary shielding against damage that the harsh light could do to the unprotected, developing tissue. Yet be careful with judging by the colour alone. ❐

Fig.4 *Equisetum arvense* L.; inset: differences between fertile and sterile stems

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Ferning in snow

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Fig.1 Andrew considers his options with Mt Teide towering in the background.

Fig.2 Two small plants of *Cheilanthes guanchica* in full sun suspended inches above a blanket of snow.

Many years ago I organised a BPS day meeting in mid-winter (15th February, 1975) in the Sussex Weald. It was slightly facetiously called 'Snow meeting'! Fortunately it did not snow but the weather was not great! Despite it all we enjoyed the day and the evergreen nature of so many ferns allowed them to be spotted in winter. In total 11 species were recorded including *Dryopteris aemula* and *Hymenophyllum tunbrigense*.

In February this year a small group of fern enthusiasts (Alison Evans, Michael Hayward, Andrew Leonard, Tim Pyner and me) set off on a non-BPS trip to Tenerife for a ferny mid-winter break in the hot sunshine. Unfortunately the dreadful weather we had been experiencing in the UK was being blown due south all the way to the Canaries! We arrived to cold, torrential rain at sea level – but clearly this fell as snow in the mountains and the main cross island road was closed for a day or so. Eventually, when we heard the road had been re-opened, we decided to try venturing up the mountain. At El Portillo, where the altitude was about 2000 meters, we came out of the forest onto a scrubby rocky plain which is normally semi-desert. At the time of our visit it was covered with, on average, about 2 inches of snow. It being a weekend all the world and his friend were on the mountain enjoying winter sports!

After parking with difficulty and undeterred by the snow Andrew led us off into the wilderness to look for ferns. The sun was out and Mount Teide (3718 metres) was looking magnificent in the distance, but what of ferns? Amazingly we found two species, *Cheilanthes guanchica*, and *C.tinaei* both looking in perfect health. C.guanchica turned out to be pretty common here, and on the island generally but we only saw a few *C.tinaei* at this one site…in the snow! Both species were growing in crevices on the sides of boulders so snow had not settled on them directly or, if it had, it had probably melted by the time we got there. ❐

Fern Enthusiasts do the strangest things.

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Anyone who's been on a BPS field meeting will tell you it's the people more than the ferns which make it such good fun. So, when not trying to get that perfect fern photo, I sometimes try and capture the fern enthusiast at work. The selection I give here could all be candidates for that "Christmas Caption" competition, but I'll just try and say what's going on. Figs 1 and 2 show the classic Pteridologist swarms, be they at work in a London street (Fig.1) or on the Dorset coast (Fig. 2). I often wonder what the passing public must think!

Fig.1 The BPS at work in a London street

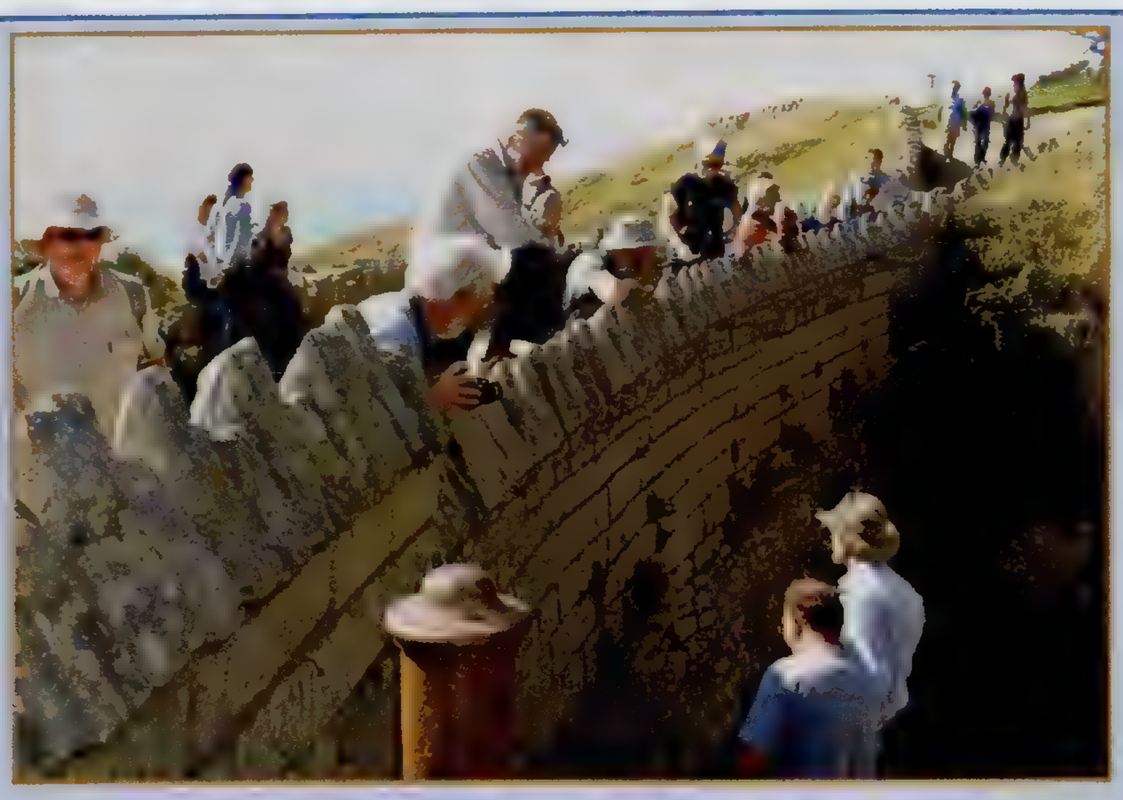

Fig.2 The BPS on the Dorset coast

Fig.3 Sue Olsen

Fern Photographers at work

Fig.3 - Sue Olsen apparently about to be devoured by man-eating crosiers

Fig.4 - Pat Acock squashed into a 6 inch gap between fern benches

Fig.5 - Yvonne Golding getting a nice close-up

Fig.6 - Pat Acock taking a photo of me taking a photo of Pat Acock taking a photo of me taking a photo of ..... – I'm inside a waterfall

Fig.7 – Matt Stribley helping Robert Sykes to – well, take a photo I guess – with Sue Sykes looking on.

Fig.4 Pat Acock

Fig.5 Yvonne Golding

Fig.6 Pat Acock et al

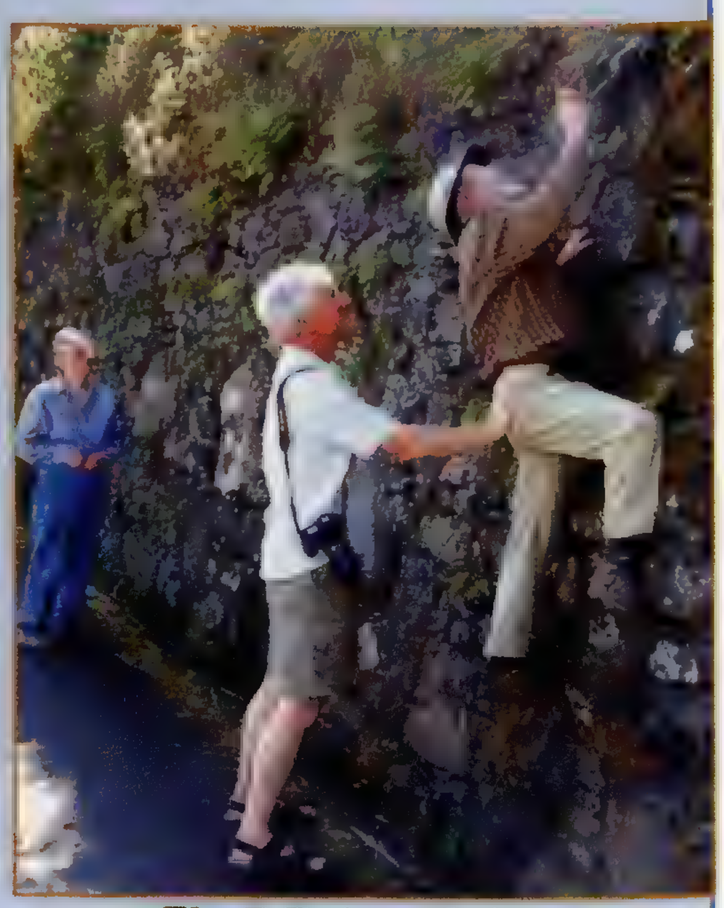

Fig.7 Robert Sykes

Fern Enthusiasts do the strangest things.

"I love ferns" enthusiasts –

Fig.15 (Left) Karen Munyard doing her "hug a tree fern a day" bit

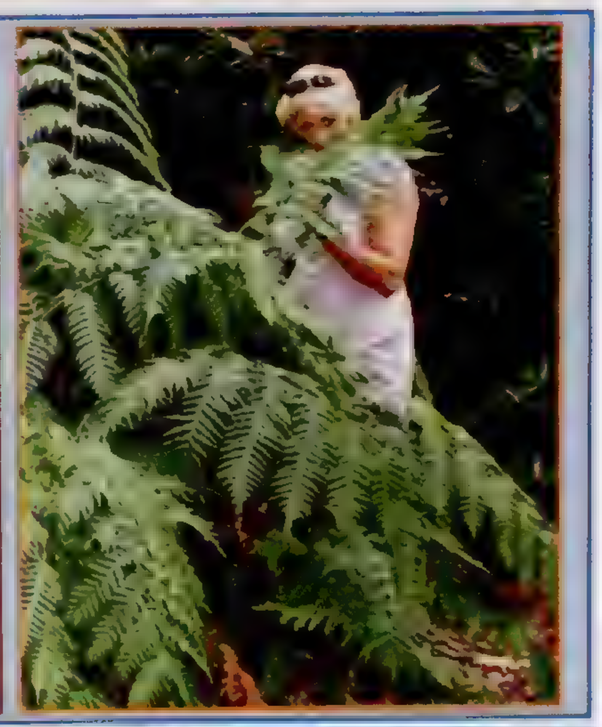

Fig.16 (Right) Gill Smith intoxicated with fronds

They say actions speak louder than words :-

Fig.11 (Left) William Hughes demonstrating – well, frond size I guess – to Jennifer Ide

Fig.12 (Right) Iwan Edgar demonstrating – well, even bigger frond size to Paul Ripley and Lindsey Holleworth

Fig.13 (Left) Pat Acock admonishing a patch of polypodies for not being a rare hybrid

Fig.14 (Right) John Sanford about to reveal all to Martin Rickard – the wary look on Martin's face is priceless!

Cyrtomium falcatum

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Fig.1 *Cyrtomium falcatum* on Endsleigh School wall in 2005. Now gone.

In last year's *Pteridologist* Neil Timm asked whether anyone knows of a *Cyrtomium falcatum* further north than his Lincolnshire site. Well, the answer is, yes - it has been found at two sites on walls in Hull. I haven't seen it there myself, but the accompanying pictures from Richard Middleton of the University of Hull prove the point. The first site with just one plant persisted from its first notice in 2004 until 2005, when it was producing spores. It was gone by 2006. The other site was found in 2008, also with one plant, and is still there.

My thanks to John Wilson, a B.P.S. member from Hull, for passing this information to me.

Fig.2 *Cyrtomium falcatum* on a wall in Hull Museum garden June 2008.

Hopefully new records extending the northern range of *Cyrtomium falcatum* will continue to be discovered. How about all you Edinburgh botanists having a look around?????! Ed.

Members gardens - Scarthwaite, Borrowdale.

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Nan Hicks

For many years, whenever the B.P.S. has met in the vicinity of Borrowdale, Cumbria, the day is usually rounded off with a visit to Scarthwaite, the home of Nan and Sam Hicks, in Grange-in-Borrowdale. Some say the attraction is the wonderful collection of ferns in the garden, whilst others swear by Nan's baking! In fact, at a meet in nearby Newlands Valley in the summer of 2008, one member who was unable to get to the venue in the morning, decided to go straight to Scarthwaite and was found resplendent, surrounded by ferns, cakes and freshly brewed tea. – Heaven!

These visits began in 1991, which was the Centenary Year of the B.P.S., and a National Field Meeting was held in the Lake District. They visited Nan's garden, no doubt lured by the many magazine articles about Scarthwaite and a feature on T.V. in 'Secret Gardens'. The garden was part of the National Garden Scheme from 1988 until 2008, and over this time thousands of people have admired her horticultural skills. Nan subsequently joined the B.P.S., and for many years was a very active member attending and leading field trips and even once manning an award winning stand at Holker Hall Show in full Victorian costume! (The exhibit was awarded the Gold Medal and Best in Show for Society exhibits)

Nowadays Nan regrets that she is not as active as she once was, but takes great delight in having the 'fernies' round and will often start baking days before the event. She refers to the B.P.S. as the 'Society of Fronds' and enjoys showing members round her garden which she has looked after for the past 40 years.

It is obvious, when visiting, that ferns take pride of place. They are everywhere. Many ferns are planted as single specimens, others in drifts among shrubs and herbaceous plants, others in walls and even amongst paving stones. The neutral-to-acid soil seems to support a vast range of ferns with ease, and the planting gives the general impression that everything thrives in this environment. However this garden is not without its problems, one of which is rainfall. Just up the valley is the wettest inhabited place in the British Isles with an average annual rainfall of over 130" per year (3300mm). Nan jokes that "folk in Borrowdale reckon that 3 days without rain is a drought!" This high rainfall, whilst being a major benefit for the ferns, tends to wash away the topsoil, under which is mainly gravel and stone. This is very free draining, but Nan finds that it cannot be dug with a spade very easily, so she resorts to using a fork and gives any planting

Fig. 1 One of the several narrow paths at Scarthwaite.

Fig. 2 Many ferns are in pots like these near the house.

hole a generous lining of compost. The other major problem is wind. This tears down the valley and is funnelled into Grange–in-Borrowdale by Castle Crag, (Fig.3) a feature known locally as the Jaws of Borrowdale. So the views have been sacrificed for a shelterbelt, mainly of juniper and rowan. Further trees and large shrubs dominate the garden and it feels as though you are walking through dense woodland as you wind your way along the several narrow paths.(Fig.1) Many ferns are in pots.(Fig.2) Nan explains that by growing them this way they do not suffer any competition and can easily be moved to find the best location for each individual fern. There is one exception – Nan finds that polypodiums prefer to be in the ground and don't seem to like being restricted. Curious when you consider they often grow in walls and other localities where the root system can be confined.

With over 400 ferns in this garden, of which about 300 are individual species or varieties, it is difficult to do justice to them all, but I found many memorable highlights in this third of an acre garden. Nan has gathered her ferns from many different sources. As a good friend of the late Reggie Kaye, she has been fortunate enough to acquire an original *Athyrium filix-femina* 'Victoriae'. This 25 year old plant is tucked away in a border surrounded by geraniums (Fig.4), which are another of Nan's favourite plants. Many examples of *Polystichum setiferum* 'Bevis' are dotted about as a result of dividing an original crown. Incidentally, Nan insists that Bevis should be pronounced as rhyming with Nevis (as in Ben Nevis, the mountain)! A huge specimen of *Dryopteris affinis* 'Cristata' was possibly her first purchase from Reggie Kaye along with many *Asplenium Scolopendrium* varieties such as 'Kaye's Lacerated', and 'Crispum Moly'. From Martin Rickard, "before he moved", there are many *Polypodium* 'Cambricum Group' varieties which provide excellent structure in the autumn. Adiantums proliferate in areas of low light with *A. venustum, A. pedatum* and the magnificent *A. aleuticum* tucked under shrubs and by the side of the house.

Other ferns have often been gifts from neighbours, inherited from well wishers or even wild finds. A huge proliferous *Polystichum setiferum (*Divisilobum Group*)* resides in a very large pot near the house, each frond bursting with bulbils. It was left to Nan in the will of 'a very old lady from Keswick', who had kept it on her window ledge and heard that Nan liked ferns! Nearby was *Polystichum setiferum* 'Cristato-pinnulum' reputed to be very sparingly fertile,(Fig.5) which was sporting 'frondlings' at the base of the pot just to prove it's point! This had been thrown out and rescued from another house in Keswick!

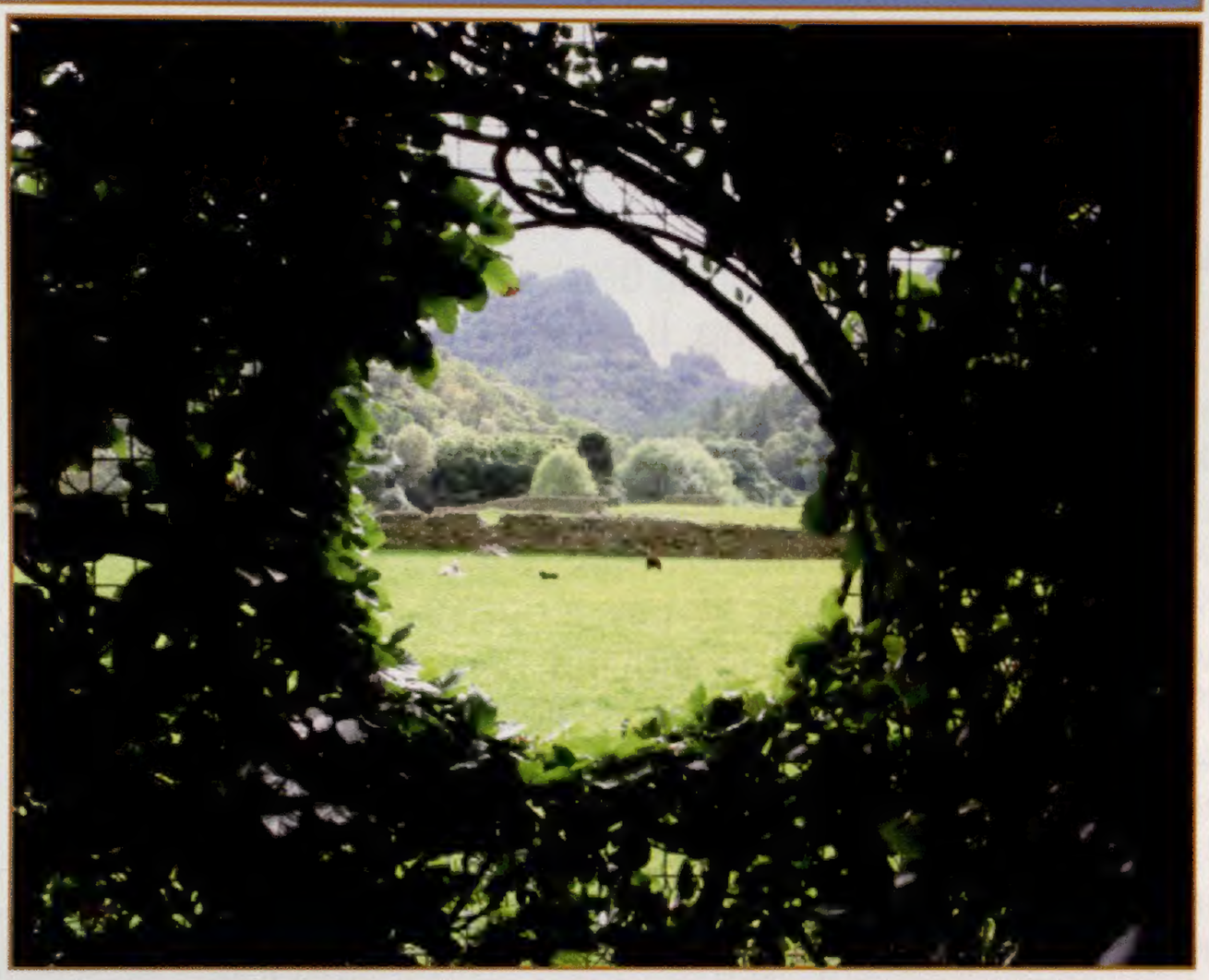

Fig. 3 A view through the shelterbelt looking at Castle Crag.

Fig. 4 *Athyrium filix-femina* 'Victoriae'.

Fig. 5 *Polystichum setiferum* 'Cristato-pinnulum'.

Members gardens - Scarthwaite, Borrowdale.

At the front of the drive resides a large *Osmunda regalis.* Well, I regarded it as large until Nan commented that in 2007 it was over 7ft high (2.13 metres) and was currently suffering because of a dry period in the Spring. It appears to be growing in gravel but there must be lots of moisture somewhere because Nan never waters a mature plant. "it mollycoddles them." In fact Nan's general philosophy is simply to leave well alone if a plant is thriving. Very mature ferns are sometimes divided, "but only in Spring, it gives the best chance of success." All new plants are placed in quarantine until Nan is absolutely sure that there is no vine weevil present. She has found this to be a major problem recently.

Because Nan plants in layers for succession there is lot of competition for moisture, shade and light. Over the years Nan has found that Polystichums in particular start to die back if they are in a dry shady location for too long "they need the moisture". Conversely, *Gymnocarpium dryopteris* is such a moisture lover that it can survive in a pot even if totally waterlogged (a not uncommon event in Borrowdale!)

Nan says that she has no individual favourites amongst her ferns, and that she just loves them all. However her eyes light up when she talks about her collection of *Athyrium niponicum* varieties (Fig.6) which she uses to great effect in these shady borders to provide contrast with the many geraniums, primulas, fritillaries, erythroniums and trilliums that thrive in this woodland garden. She also speaks fondly of *Polystichum setiferum* 'Plumoso-multilobum' which she describes as looking "as though the fronds have been stirred, like paint, and left to swirl around."(Fig.7)

Nan's lounge is, as expected, littered with fern books. Pride of place goes to the 'Encyclopedia of Garden Ferns' by Sue Olsen – it was a gift from the North West Branch of the B.P.S. as a thank you for all the memorable visits over the years. But guess what fern literature goes on her bedside table to be read in those quiet moments at the beginning and end of the day? Of course – the Pteridologist! ❐

Fig. 6 *Athyrium niponicum* 'Pictum' providing contrast in a shady border.

Fig. 7 *Polystichum setiferum* 'Plumoso-multilobum' looking "as though the fronds have been stirred, like paint, and left to swirl around."

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